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JPRS 81315

20 July 1982



# Worldwide Report

TELECOMMUNICATIONS POLICY,  
RESEARCH AND DEVELOPMENT

No. 228

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**FBIS** FOREIGN BROADCAST INFORMATION SERVICE

REPRODUCED BY  
NATIONAL TECHNICAL  
INFORMATION SERVICE  
U.S. DEPARTMENT OF COMMERCE  
SPRINGFIELD, VA. 22161

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20 July 1982

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# MIDAS PACKET SWITCHING SYSTEM UNDERGOING ENHANCEMENT

Canberra THE AUSTRALIAN in English 17 May 82 p 26

[Article by Michael Gordon in Canberra, Peter Cole-Adams in Washington, and Peter Smark in London]

[Text] Even in the age of the silicon chip, it takes time to make a revolution. Most Australians today are only dimly aware of an impending information revolution.

Although in its early days, it has the potential to effect our lives as fundamentally as the invention of the printing press, radio and television affected earlier generations.

Unless a great many hard-headed people are wasting their time here and overseas — and some sceptics believe they are — the era of the electronic newspaper it at hand.

The two-way technology of videotex, as it is called, is already available, and has one overwhelming advantage — it takes only two minutes for the simplest mind to master.

While developments in Australia have been slowed by the Federal Government's decision last year to block Telecom from establishing a national videotex service, there has been much movement in recent days:

- Australia's first videotex service, Austel, operating as a joint venture by Computer Power and Control Data, has moved to extend its operation from Melbourne and Sydney to Perth, Canberra and Adelaide;

- Myer's videonet service has been demonstrated publicly in the past two weeks and will begin operating on a commercial basis later this year;

- A third service, called ICL Data Services, plans to open between Melbourne and Sydney this month, offering a demonstration data base of 1000 pages of information;

- An experimental videotex service using Computer Power equipment and expertise, has been established in Adelaide, involving the Adelaide 'Advertiser' and several State Government departments; and

## 'Successful'

- Telecom has been working on a new submission to the Government for a national videotex system with "maximum private sector involvement." The submission is expected to be lodged soon.

The videotex debate here and overseas involves a number of questions: Who should provide the service? What information should be provided? Who should have access? What should be the cost?

Beyond these are questions of privacy, civil liberties and Government responsibility. In Australia, for instance, it is unclear whether State or Federal Governments have responsibility. The issue hinges on whether responsibility is determined by the means of transmission (a Commonwealth responsibility) or the content (a State matter).

The difference between videotex and teletext, which has proved popular in Europe, is that videotex is much more than an information source.

In Britain two teletext services — Ceefax run by the BBC, and Oracle run by the Independent Television network — share band-width capacity in the television broadcasting signal to transmit text on to ordinary TV sets fitted for the purpose of a rental of about \$A5 a week.

A device like a channel changer is used to call up brief news, racing results, motoring information and so on. Each system has about 300 pages of regularly updated information and hundreds of thousands of users. Communication is one-way, but there is the advantage that there is no phone call charge, no royalty payments and no computer charge. The rental fee is all-inclusive.

Videotex offers all that teletext can give and more. Communication is two-way, so it is possible to buy and sell, negotiate and add to the information already available. The process is simple. Using a keypad the size of a calculator or a keyboard that looks like a miniature typewriter, the user clocks in with a password and is presented with a numbered index on the screen. By pressing the number of the required subject heading the user works through to the information required. It might be airline timetables or commodity prices in a particular area. The user can then book a seat or make an offer for goods. The transaction takes place in seconds.

So far, there are four broad types of Videotex systems available: the British Prestel system, which is the only one operating on a large scale at this stage,

the Canadian Telidon, which, while more sophisticated, is not yet in wide use, the French Prestel system, which is similar to the Prestel system, and the Japanese Captain system.

Prestel-compatible systems are being used by two of the three videotex services operating or expected to operate soon in Australia.

Telecom in Britain developed the system and launched it in September 1979 with the intention that it operate for the entire community. It has since discovered that the public is not willing to pay a very high price for information.

Prestel has about 17,000 users but its domestic penetration is negligible. Where the service has been installed in the home it has for the most part been to assist commodity dealers who want to check prices before they leave for the office.

They have paid up to \$A1600 for a special receiver or \$A150 for an adaptor for an ordinary color set and use telephone lines as a link between the sets and more than 222,000 pages of information.

Australia's Telecom resolved to establish videotex here based on the Prestel system in November 1980. Among the arguments were that only Telecom could offer open access to the system at the cost of a local telephone call. It also argued that it had the technology and the marketing division, that its application was supported by overseas practice, and that public ownership of the service would avoid private competitive practices that could disadvantage the public.

Between November and October last year, the Government was subject to intense lobbying from companies such as Myer and Kerry Packer's Publishing and Broadcasting Ltd, which has since dropped out. Lobbyists skirted around the Department of Communications and concentrated on the Minister, Mr Sinclair, the Prime Minister, Mr Fraser, and the back-bench communications committee.

In a paper outlining its proposal, Telecom said: "Given the relatively small size of the Australian market, it will be important to avoid problems of market fragmentation when establishing a videotex industry. This has already occurred in America and it is doubtful whether the market in Australia would be viable if a number of different system standards were introduced.

"In addition, the resultant confusion and lack of confidence of users might delay market acceptance of the whole concept of videotex."

It argued that if its proposals were accepted, private enterprise — mainly acting as suppliers of terminals and providers of information — would share 80 per cent of the unified national service. It said: "The alternative could well be a higher private enterprise share of a small, fragmented market lacking consumer and industry confidence."

The assessment might well prove to be accurate. In the past four months, three videotex services have emerged. Only one is in operation. Ironically, two of them — those with systems compatible with Prestel — would support the inclusion of Telecom in the industry.

The odd one out at this stage appears to be the Myer Emporium, which gave the first public demonstration of its videonet videotex service late last month. It plans to have it operating commercially late this year.

Myer is using the Canadian-

developed Telidon videotex — more sophisticated, more expensive and incompatible with Prestel. If Telecom were able to launch a national service with Prestel software, Myer would have much to lose. The other Prestel-based systems would be able to link with Telecom and Myer's potential on a national basis would be limited indeed.

The attraction of Telidon is said to be that it is an ideal system for advertising. The graphics are far better than those in Prestel, which is restricted to seven colors. The lines are smoother, more detail is possible and images can be animated.

During recent demonstrations, the Videonet people have emphasised that they do not see "teleshopping" as their prime goal, although this will be possible when the system is established. Curiously, the general manager of Videonet, Mr Glen Davis (who was involved in a world trial of the Prestel system while with the departments of Productivity and Science and Technology), appears unaware of Telecom's latest move.

Australia's first videotex service was launched by Computer Power of Melbourne in January with 500 pages of information on subjects ranging from the weather to the best rate of application of superphosphate.

The company, which has since been appointed as agent for Prestel's world videotex service, is

now operating as a joint venture with Control Data, and has a distinct advantage over its opponents. Control Data already has a series of leased circuits from Telecom, enabling it to offer information, in the first instance, in Melbourne and Sydney, for the price of a local call.

Computer Power's information providers include the Department of Agriculture, TAA, and an independent public relations company.

The publisher of 'The Age', David Syme & Co Limited, obviously aware of the potential videotex has to take classified advertising away from newspapers, has expressed interest in videotex, but has not tied itself to any company.

In America, other systems similar to View Data have developed alongside videotex, many of them based on the same principles but building on computers performing other functions.

There, all sorts of interests have been rushing to get into the act: Banks, network and cable television companies, telephone companies, newspapers, retailers.

As with Telecom in Australia, much attention in America is being directed to the future role of the telephone companies, particularly the big American Telephone and Telegraph Company.

The manager of Computer Power's videotex, Mr Scott Sanderson, like many others, believes it will be a long time before videotex can develop as a mass medium, here or overseas.

He believes it would be a good idea for Telecom to be involved in a national service, provided this meant that videotex extended to country areas at the price of a local call.

The third planned videotex service, ICL Data Services, would also support Telecom's involvement. The group's manager, Mr Tony Cohen, argues that Telecom's involvement would allow private companies to concentrate on specific market sectors. For example, ICL could rent 1000 frames, or pages of information, from Telecom as an information provider and develop its own markets.

He sees another advantage in Telecom acting as bill-collector. Videotex charges would be sent out as part of the telephone bill and there would be a greater incentive to pay on time.

Mr Cohen believes the Government's decision to block Telecom added to the "built-in inertia" of businessmen by creating uncertainty. Even so, he argues that

Australia, because of its size, has the potential to make better use of videotex than anywhere else.

But the Government is not likely to change its view that videotex should be left to the private sector without a good deal of internal debate. One of the issues to be considered is whether Australia should attempt to take a leading position with what is essentially a new technology.

Although there are 14 commercial videotex services listed as being in the testing stage by the LINK market research organisation, only Prestel in Britain is at all widespread. The public Telidon service in Canada is listed as having 320 users, while the Canadian Government's information Telidon service has 100 users.

Perhaps even more important is the issue of Telecom's spending priorities. If the question was put to Telecom subscribers, many might argue that the investment of about \$6 million necessary to establish a national service (according to Telecom's first submission) would be better spent on improving the telephone service.

There is also the question of whether all users should be able to "plug in" to videotex for the cost of a local telephone call. In Britain this was at first found to be an impractical goal because of cost, although 80 per cent of Britain now has access to videotex at the cost of a local call.

CSO: 5500/7547

RESEARCHERS WARN OF NEED FOR MICRO ELECTRONICS ACTIVITY

Canberra THE AUSTRALIAN in English 18 May 82 p 27

[Article by Nicholas Rothwell]

[Text] AUSTRALIA'S industry will need the support of a strong, indigenous microelectronics industry in future years, two leading researchers in computing science warned at last week's AN-ZAAS Congress.

Dr D. Beanland and Dr H. Harrison from the Royal Melbourne Institute of Technology presented a paper indicating that international developments in the microelectronics industry would be crucial for Australia's high technology future.

"Integrated circuits are incorporated into countless products and most manufacturing processes are dependent on them, and the technology to produce them is developing rapidly," the experts said.

But although the technology was crucial, control, development and exploitation of it had not been widely spread, with the result that the industry was dominated by only a small number of countries.

Complex technological processes, extensive scientific know-how and computerised manufacturing were essential to make integrated circuits.

The technology had been advanced so that fabrication of increasingly complex circuits was possible at lower and lower prices.

"We believe that Australia should be involved in this technology because of its potential to affect so many facets of our society," the authors said.

In an extensive analysis of the industry and the economics of micro-circuit production, the authors suggest

a direction for Australia to develop its own microelectronics fabrication centre.

The global integrated circuit industry has developed at near exponential rates, with an annual doubling of the complexity of integrated circuits.

But a slowdown in the rate of increase in integrated circuits' complexity had been experienced because of the "enormous investment in design time required for complex circuits".

### **CHALLENGED**

Without improved computer tools for design and layout, growth in complexity would be substantially slower in the future, and similar arguments would apply to the problems of testing associated with complex circuits.

The key factor for the development of the industry included technological innovation, appropriate research facilities and heavy demand for new, advanced products.

In addition, a healthy business climate and the liberal availability of essential capital had been a fertile soil for the growth of the integrated circuits industry of the 1970s.

But since the mid-1970s the American market's pre-eminence had been challenged by the Japanese through a "planned approach to national technological development".

The two authors identify new developments in the industry which have had a radical effect on its structure and may be important in devising an Australian strategy for market entry.

The most important of these is the introduction of large-scale government support for the microelectronics industry, with the major example being the Japanese \$600 million VSLI support program, the American VHSIC program and various European government incentive programs.

"These incentives represent a large influx of money into the technology-push without a comparable input into the user-pull area, with the exception of the Japanese program, and the American venture in particular has been the subject of much criticism in this regard," the authors said.

The other crucial development in the industry was a

drop in the number of component suppliers, balanced by a jump in "in-house" supplies of microchips — a development that created "captive suppliers".

This development was the result of the realisation on the part of leading high technology manufacturers that control of the integrated circuit industry was essential for them to maintain pre-eminence.

The RMIT experts also indicated that new material technologies (such as gallium arsenide) and the introduction of semi-customised gate-array chips would have a significant impact on the market.

They suggested that gallium arsenide chips would be developed into commercial VLSI devices within three years and would soon gain 20 per cent of the silicon substrate market in critical areas.

"In a global sense Australia's role as both a semiconductor producer and user can only be described as insignificant," the authors said.

But the nation had limited integrated circuit production capacity and two companies — AWA and Philips — had considerable experience in custom design and fabrication.

These companies were largely dependent on overseas support for process establishment, and this meant that little research and development was undertaken at either centre.

"Fall-out from the global VLSI design explosion has affected Australia in that a team concerned with research and development of the design tools and techniques has been established by the CSIRO," the authors pointed out.

CSIRO was also active in promoting the spread of the design techniques associated with metal oxide semiconductor integrated circuits through a multi-proj-

ect chip venture that co-ordinated several different groups.

The RMIT and NSW University Joint Microelectronics Research Centre was also pioneering new techniques of fabrication, design and application.

One of the most important fields being studied by the Centre was the use of ion-beam technology for device fabrication.

Other crucial research was being carried out by Telecom, the Defence Department and the Australian Atomic Energy Commission's Lucas Heights laboratories.

"Although the various national programs are adequate for activities at the existing level, they would need to be expanded to provide the necessary manpower for any growth in Australia's microelectronics activities," the authors said.

Activity in the Australian microelectronics industry would have to be competitive on an international level if it was to be effective against readily available components in cost and performance.

International integrated circuitry companies already had a stranglehold on standard components for the large markets, so there was little likelihood of an Australian microelectronics company being capable of competing in these markets.

### **EMPHASIS**

But specialist fields where this country's researchers had expertise, such as medical electronics, scientific instrumentation and mining control, were promising fields for the local industry.

"The emphasis placed upon custom integrated circuits must be continued in Australia — this is a technologically demanding route because the unusual, difficult or novel becomes essential.

"Well-developed design skills and design tools are fundamental to the success of such activities and they

must match and interface with the state-of-the-art processing required," the authors said.

The international microelectronics industry's developments towards lighter devices, capable of being tailored to specific applications including programmed logic arrays, gate arrays and polycell technology, were compatible with intensive development of the local industry.

A custom-based microelectronics industry here could be assisted in its economic viability by a base product line of standard integrated circuits made under licence.

CSO: 5500/7547

# ELEVEN GROUPS SEEK OK FOR LOW POWER FM STATIONS IN SYDNEY

Sydney THE SYDNEY MORNING HERALD in English 18 May 82 p 3

[Text]

Eleven groups have applied for nine licences to operate low-powered "neighbourhood" FM radio stations in Sydney.

The nine stations will have a broadcasting range of only about 5 kilometres and are barred from running advertisements. They can, however, accept sponsorship, which means they may give the name and address of a company but may not give details of products or services.

The Australian Broadcasting Tribunal will hold public hearings into the applications from June 29 until July 9.

The former State Minister for Youth and Community Services, Mr Dick Healey, has joined the former ABC federal director for program services, Mr Robin Wood, and others to form the Northside Broadcasting Co-Operative Ltd, which has applied for the licence to broadcast in the Ku-ring-gai, Willoughby, Lane Cove, North Sydney, Mosman area.

Mr Healey retired from State Parliament last year.

Other directors of Northside are John Crew, Joanne Sinclair, David Curtin, Gerard Johnson and Noel Rejdy.

There are two applicants for the City of Sydney, Leichhardt, Marrickville, Botany area: the Philo-Hellenic Radio Association and Radio Skid Row.

Directors of the Philo-Hellenic Radio Association are G. Arvanitakis, E. Eleftherias, P. Xenos, T. Nikolaidis, G. Parris, B. Pappas and P. Samartis.

The chairman of Radio Skid Row is Michelle Wearn, the

treasurer is Rosilyne Spiers, the secretary Gary Moore, and directors are E. Wilkinson, Ken Sanz, Sally Bryant, Michael Edwards, Mark Bowman, Eva Szarbo and David Gibbons.

The applicant for the City of Sydney, Botany, Randwick, Waverley, Woollahra area is the Radio Eastern Suburbs Association.

The association's chairman is Professor Neil Runcie and the directors are Eric Baker, Peter Joyner, Margaret Barry, Nancy Hillier, Naomi Gale and John Brownscombe.

RDJ-FM Community Radio has applied for the Ashfield, Burwood, Concord, Drummoyne, Strathfield area licence. The secretary is Dorothy Broadhead and Warren Hicks is a director.

There are two applicants for the Marrickville, Hurstville, Kogarah, Rockdale area: the Narwee Baptist Community Broadcasters Ltd and the Southwest Community Co-op.

The chairman of the Narwee group is the pastor of the Narwee Baptist community, Michael Dennis. The directors are Graham Baillie, Brian Booth, John Garlick, Donald Jamieson, Ruamah Meyer, Joan Staples, Errol Thompson and Fred Knowles.

The chairman of the Southwest Sydney Community Co-op is Wal Whittaker, the secretary is Rod Sewell, the vice-chairman is Greg Bull, the treasurer is Kingston Anderson and directors are John Faulkner, Annabel O'Flynn and Desmond Crowley.

The applicant for the Liverpool, Green Valley, Fairfield area is the Liverpool-Green Valley Community Radio Association. The coordinator is Frank Scambary and the secretary Joan Killorn.

Bankstown City Radio has applied for the Bankstown, Auburn area. Mr G. S. Gray is the group's chairman, Geoff Goque is secretary and directors are Mark Denmeade, Mick Hatton and John Vandermeij.

The Manly-Warringah Media Co-operative Ltd has applied for the Manly-Warringah area licence.

The secretary is Mr W. G. Richmond and directors are Gregory Dodwell, Joan Kohler, Graham Lockley, June Mason, Ian Munro, Wayne Richmond, Paul Robertson, Patricia Russell, Muriel Sell and Trevor Smith.

Ryde Regional Radio has applied for the Ryde, Hunters Hill area.



# AGREEMENT SIGNED ON SATELLITE GROUND STATION CONSTRUCTION

## Aussat Announcement

Brisbane THE COURIER-MAIL in English 18 May 82 p 3

[Text]

SYDNEY. — Formal agreements have been entered into to buy Australia's first satellite system, the Aussat Pty Ltd. chairman, Mr Stan Owens, announced yesterday.

Aussat is the government owned company established in November last year to own and manage Australia's national communications satellite system.

The agreements, between Aussat and Hughes Communications International, a subsidiary of the Hughes Aircraft Company, cover manufacture of three identical satellites and two ground control stations.

The capital costs of the agreements with the Hughes organisation and the cost for two launches and associated insurance will be \$166 million.

The total capital costs to Aussat of establishing the satellite system, including the major earth stations will be about \$225 million.

Mr Owens' announcement follows the statement in Federal Parliament on May 6 by the then Minister for Communications Mr Sinclair, that the government had approved the establishment of the satellite system.

The system, which will be operating in 1985, will provide a wide range of modern telecommunications services to Australians.

Major users will include the Australian Broadcasting Commission, the aviation and maritime transport industries, Telecom, commercial broadcasters, the general business community and community groups.

Mr Owens said that Aussat would be run as a commercial tax-paying enterprise, funded by equity capital invested initially by the government and loans from financial institutions.

"The finance package which has been arranged for Aussat compares favorably with the best funding arrangements available in the world.

"These finance arrangements are indicative of the international finance com-

munity's confidence in the project and in Australia's future," Mr Owens said.

It is intended that as soon as practicable 49 percent of the issued capital will be offered to the Australian public.

Charges for use of the satellite, known as transponder tariffs, would be set at rates comparable with those being charged in other countries with similar systems. Financial viability assessments indicated that Aussat would generate sufficient revenue to meet all of its operating costs, repay debts and interest and return reasonable dividends to shareholders during the life of the first generation of Aussat satellites, Mr Owens said.



## Satellite Specifications

Sydney THE SYDNEY MORNING HERALD in English 18 May 82 p 2

[Text]

This is a scale model of Australia's domestic communications satellite, two of which are due for launch in mid-1985.

The model was on display yesterday at a press conference held to mark the formal signing of agreements between Aussat, the Government-owned company formed to own and manage the satellite, and Hughes Communications International.

The initial cost of establishing the satellite system will be about \$225 million, but the total cost is expected to reach \$650 million.

The chairman of Aussat, Mr Stan Owens, said yesterday that the major users would include the ABC, the aviation and maritime transport industries, Telecom, commercial broadcasters, the general business community and a large number of community groups.

The Aussat satellite will be 6.6 metres high and 2.2 metres in diameter and will weigh about 1200 kg. It will have an operational life of at least seven years. Three will be built, the third remaining on the ground to be launched if required.

CSO: 5500/7547

# REVIEW OF NATIONAL DEVELOPMENTS IN VIDEOTEK FIELD

Melbourne THE AGE in English 18 May 82 pp 1, 6

[Text] NOT so long ago anyone hearing of governments and large corporations spending vast amounts of money on "R and D" could be forgiven for thinking it meant retailing-and-defence or rubbish-and-dumps.

Even today R and D does not hold all that much significance for the man on the street — unless of course he is employed in the growing R and D industry.

R and D is the heart of the information revolution which is faced with the task of integrating and at the same time diversifying the world's communications systems.

This process, commonly called converging or convergent technologies, has placed extraordinary pressure on the makers and marketers involved.

Having a good product is no longer good enough. Now the market wants it to be compatible with an increasing number of other items.

Until recently, anyone told typewriters would one day be talking to computers would have thought it a joke. Now typewriters which have no fundamental ability to communicate with computers or other typewriters are considered redundant.

## CHEAPER

While basic componentry is becoming cheaper, putting it together is not.

Manufacturers now have to put much more effort up front

and are required to analyse the market's need and any major change which is likely to affect market conditions.

Any product then developed has to do the job it was designed for as well as integrate into the market-place.

Packet switching networks embody the whole problem. In essence they are a group of data banks joined together by elaborate telecommunications systems. Putting them together is an almost impossible task, but once they are linked they can achieve a great deal.

Obviously the greater the data base and the wider the access, the better the system.

Many company computers talk to other companies' computers. But most are wired for a specific purpose with the link-up custom made.

It is along these lines that Australia's Overseas Telecommunications Commission (OTC) has been active in trying to get Australia linked to the rest of the world.

Three years ago, OTC started Midas, a packet switching system which plugged directly into the Tymnet system in the United States. This gave Australian users access to data banks across the US and in Europe.

The demand on the system has been so great that OTC has had to update.

It is in the throes of replacing the original Midas node in Sydney with a new Tymnet "engine".

Tymnet operates a packet switching network and also markets equipment. The new engine, as Tymnet calls it, is a

modular unit which can be built on as the need arises. It is also much more flexible in programming than the original node.

In the three years the old node has been in place, the technological developments and the increasing market demands superseded the capabilities of the old processor.

A major limitation of the old system was its inability to give overseas data networks access to Australian data bases, thereby creating a one-way information flow and making it impossible for operators of Australian data bases to sell their goods overseas.

This was a major flaw, considering it is intrinsic to the idea of data networks that all data be accessible.

OTC is now programming the new engine to correct the situation. It is using a tie line with an international standard interface working at up to 1200 bits per second.

Further development will enable calls to be made into and out of Australian asynchronous information banks at speeds of up to 1200 bps. Australian users accessing through Telecom's switched network are restricted by the modems available. Modems translate digital computer signals into analogue signals which can travel along the telephone

lines. This problem can be bypassed if a leased line is used.

The new Midas engine will reduce time delays for Australian users by connecting them directly to UK and European packet switching systems, instead of going through

the US Tymnet network, as was previously necessary.

Tymnet will still be used for access to US systems.

Midas' growth has been remarkable since its inception three years ago.

In the first year it grew from 34 starters to 346. In the second year to 639. In October 1981 membership passed the 1000 mark.

When Midas started, librarians accounted for most of the users. Now the commercial market is plugged in and Midas' revenue is divided equally between bibliographic searches and corporate users.

## CURIOSITY

Hobby computer operators are not a big user of the Midas service. Although their curiosity may be insatiable, their funds are not and it is easy to chalk up a large bill. OTC charges 20c a minute plus 60c for each 1000 characters transmitted.

The main thrust behind Midas' growth has resulted from convergent technologies which do not require all units in the system and those accessing the system to be directly compatible. The packet switching systems provide interfaces which overcome the problem of noncompatibility.

Whether using a keyboard, printer terminal, a visual display terminal, or a combination of all three, virtually any computer or data base can be contacted and information retrieved or exchanged.

Users do not have to be anchored to the office. Once a Midas user has been given a password he can log in from anywhere in Australia, via a telephone.

Two major features that have won customers over to Midas are its ability to access electronic mail boxes — leased space on a computer to which a user can send messages and have them retrieved by others — and its computer conferencing services.

CSO: 5500/7547

AUSTRALIA

PERTH TO BE SITE OF MAJOR SATELLITE CONTROL COMPLEX

Perth THE WEST AUSTRALIAN in English 22 May 82 p 7

[Article by Graeme Atherton]

[Text] Perth is to get a major satellite control and communications complex that will play a vital role in the operation of Australia's first satellite system.

Aussat Pty Ltd is negotiating to buy a half-hectare site in the metropolitan area and hopes to announce details of the project soon.

The complex, together with a similar one in Sydney, will be responsible for keeping the two geostationary satellites in their correct orbit.

It will also house a multiple-purpose earth station to cater for users of the satellite and its communications services.

The complex will contain two or three dish-shaped antennas--the biggest with a diameter of 11 metres.

Contract

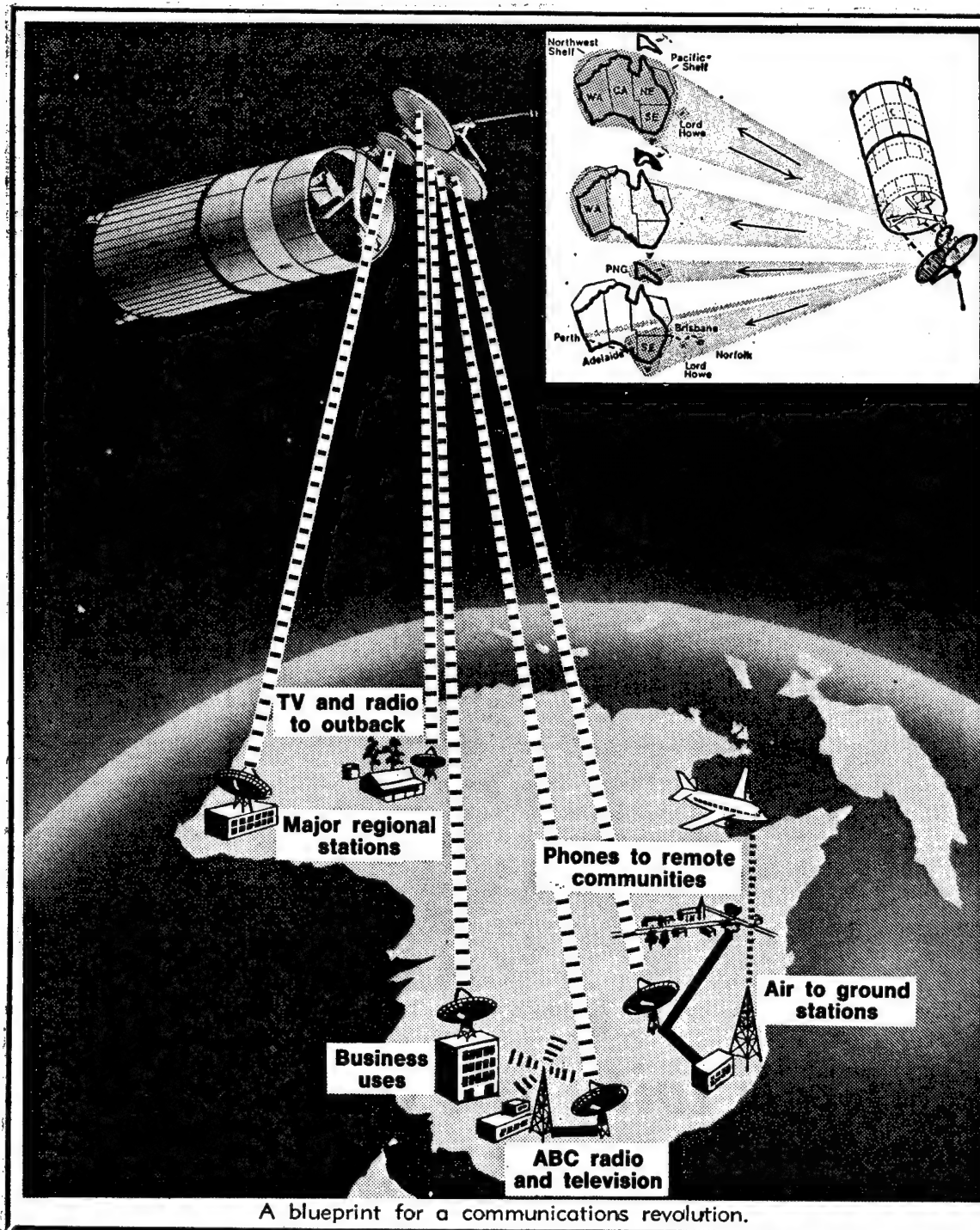
Construction of the tracking telemetry control and monitoring station is part of a \$166 million contract for the establishment of the satellite system.

The contract, with Hughes Communications International, is for the manufacture of three satellites and the Sydney and Perth ground control stations.

The stations will be capable of performing regular orbital control manoeuvres and spacecraft attitude adjustments using satellites' jet-propelled systems.

The site under negotiation is understood to be one of three sites in Perth chosen as suitable for the proposed complex.

Now that the Commonwealth has given its final go-ahead to the satellite project and the first contracts have been signed, Aussat is keen to move ahead with the construction as quickly as possible.



The Sydney and Perth control centres will need to be completed and fully operational at least six months before the scheduled launching of the satellites in July 1985.

After launching in 1985, an operational satellite and a spare will orbit 36,000km above the equator, just to the east of Australia.

The satellites will have the ability to blanket Australia, transmitting and receiving signals from both Aussat and privately owned ground stations.

The smallest of these stations will be portable devices with 1.5-metre antennas to enable remote homesteads to receive TV and radio programmes.

The outback farmer will be able to buy such a station for about \$1000, load it on to the back of his utility and set it up on his property.

Other ground stations in the capital cities will enable Telecom to supply an automated telephone service for remote areas.

Stations will also be owned by the Department of Transport for air traffic control purposes and others will be bought by users such as the police and education authorities, mining companies and broadcasters.

CSO: 5500/7547

SYDNEY COMPANY HAS HEAD START IN PAY-TV COMPETITION

Brisbane THE COURIER-MAIL in English 21 May 82 p 13

[Text]

SYDNEY. — While the Federal Government is still awaiting the outcome of the Broadcasting Tribunal's inquiry into subscription television, a Sydney-based company has apparently jumped the gun.

The company, called Television Australia-Satellite Systems, claims that it could be offering Australia's first pay television service to more than 250,000 people in remote outback areas within the next three months.

TA-SS will not be a licensed operator for these television services, but it will set up transmitters in outback communities which will, in turn, beam out boxed television signals.

The company would then rent special decoders to residents.

These decoders, when attached to the television set, would unscramble the coded signal being transmitted from the TA-SS transmitters.

The cost of the service would range from \$4 to \$7 a week, largely depending on the number of subscribers in any given area.

The service is expected to operate for about six hours every evening and TA-SS will offer a selection of television programs from Sydney's three commercial networks to local operators.

Such local operators have already been signed in an area which, the company says, covers Broken Hill, inland New South Wales and northern Queensland.

While TA-SS plans appear to be

well advanced, the service is subject to the granting of licenses from the Communications Department, and this is not expected to happen until the government has considered the outcome of the Broadcasting Tribunal's enquiry into subscription television.

Nevertheless, according to Television Australia's managing director, Mr John Hodgman, notifications for applications of these licenses had already been lodged with the department.

Mr Hodgman is the brother of the Minister for the Capital Territory, Mr Michael Hodgman, and is one of the strongest lobbyists for subscription television services for outback communities in Australia.

CSO: 5500/7548

## PLANS OUTLINED FOR PROVIDING COMMERCIAL-FREE TV TO OUTBACK

Canberra THE AUSTRALIAN in English 24 May 82 p 19

[Text]

THE lure which heavenly bodies hold for the thousands of romantic stargazers pales in comparison to the gravitational pull that satellites have on business involved in the communications industry.

Astrologers of the past had the time to observe, calculate and ponder. But waiting and ruminating are not the stuff of which profits are made.

This is why Television Australia-Satellite Systems is moving ahead with its plans — sans satellite.

Television Australia plans to supply 250,000 people in the remote areas of Australia with commercial-free television. These people have no television service, but most have video tape recorders.

The proposed service is subject to the granting of licences from the Department of Communications, Television Australia says.

The company has applied to use low-powered transmitters sending out a low coded transmission. The licences sought do not allow live broadcasting. Everything has to be taped.

Television Australia intends to use pre-recorded shows selected from the top rating ones on the eastern seaboard.

### EMPLOYMENT

The company's plans call for 147 mini stations each costing about \$25,000. The transmitters vary in cost \$4000 to \$7000, depending on the power.

Television Australia will resell all these stations to local interests, and charge the operators a fee for providing the shows.

Television Australia is not seeking a licence in its own right to operate these services.

It contends that ownership must be local and that revenue must be earned and retained as much as possible in the areas of operation with the corresponding employment opportunities developing in local areas.

It says it will supply services only to locally owned and operated businesses comprised of individuals who in every instance will be readily recognisable as the most fitting licence holders in their communities.

"None of them will represent a concentration of media ownership. But all will have the necessary technical business and finance experience to conduct a successful activity.

"Local operator appointments have already been completed, covering an area from Broken Hill in NSW to the top of Queensland in the eastern States. A major proportion of Western Australia and the central States is scheduled to be completed by June 30."

Television Australia hopes to be going within three months, government permission permitting.

The company will be delivering the tapes via its own aircraft, not satellite.

Director, John Hodgman says they will be transmitting at some 2 to 8 watts and will penetrate 3-5 km.

Deputy chairman, Mr Harold White, says Television Australia is ready and willing to commit itself to use Aus-sat, the Australian national satellite system.

"Initially, we intend introducing services to Australia's remote areas without the benefit of satellite facilities. But we recognise that satellites are the ultimate and only way in which a variety of services and options can be introduced."

The service to be introduced by Television Australia is an exciting development for the people of less populated and remote parts of the country who have not had the services which are available to the majority of Australians.

It plans to broadcast 42 hours of television a week, comprising seven days of six-hour segments from 5 pm to 11 pm. The six hours will include half an hour of local content, which will be produced by the station operators.

Mr Hodgman says there definitely will be no commercials and there will be no sponsorship.



He believes the service can break-even in communities as small as 10 households.

The cost of the service would be from \$4 to \$8 a week for a minimum of a year. The cost increases from this base level as the population in the service area diminish.

The minimum \$4 fee applies where there are 100 or more subscribers in the transmission area and the maximum \$8 fee applies for the break-even communities.

In a minimum community the annual revenue would be \$80 a week, or \$4160 a year. A 100 plus subscriber community, would be paying \$20,800 or more.

Presently the company has not appointed a chairman. The board consists of the deputy chairman, Mr White (a former general manager of OTC), Professor Taylor Howard of Stanford University (an satellite specialist), Mr Bruce Allen (a former ABC producer) and Messrs John Hodgman, James Warner and David Marina.

CSO: 5500/7548

# OPTIMISM OVER LOCAL COMPUTER, MICRO ELECTRONICS INDUSTRY

## Technological Advances

Canberra THE AUSTRALIAN in English 25 May 82 p 23

[Article by Nicholas Rothwell]

[Text] AUSTRALIA has a significant local microelectronics industry which is being overlooked because of the international nature of the computer industry and this country's predominant use of imported integrated circuits.

This view was presented by one of the nation's leading electronic engineers at the recent ANZAAS conference.

Dr G.A. Rigby, Professor of Electrical Engineering at the University of NSW, told the congress that nine centres were carrying out state-of-the-art microelectronics research in Australia's universities.

Professor Rigby, who was formerly the manager of AWA Electronics, described the different centres as "an important resource" limited only by the size of the domestic market and the level of research support.

### TECHNIQUE

Professor Rigby gave examples of technology development that demonstrated the capability of Australian experts to attract international recognition and to develop solutions to technology problems that had arisen locally.

In the manufacture of integrated circuits, the two basic techniques used for the introduction of "dopants" into silicon — thermal diffusion and ion implantation — were under devel-

opment in Australia.

Studies in this field had led to an improved technique for producing integrated circuits in both fields.

"The new processes give far more precise control over doping and are generally preferred in modern technology," Professor Rigby said.

Active research was under way in Australian centres in an attempt to provide a better understanding of the material science technique exploited in the manufacturing processes.

"This Australian program has led to international collaboration and invitation by researchers to speak at overseas conferences."

His address also gave details of promising local research into solar cells.

"The significance of this work to microelectronics lies not in the solar cells themselves but in a spin-off from the work which suggests that a surface structure involving a metal and silicon layer separated by a thin film of oxide could lead to a transistor structure for new integrated circuit applications," he said.

● LOCAL microelectronics involvement in defence projects had also generated important research and development.

Background work required to process a self-scanned photodiode array to operate at very low levels of infra-red illumination was one example.

● ONE key problem for microelectronics research involved the reduction of "bulk-trapping" defects in the silicon substrate of microchips.

"In addition to the use of low defect material, extensive experiments have been carried out with agents on the reverse side of the wafer of silicon, such as phosphorous glass."

These quality control techniques had resulted in a production yield of a factor of 20 in the circuit produced.

● THE quality needs both of defence and implantable medical microelectronic equipment had generated a strong emphasis on high reliability technologies in Australia.

Many related projects were concerned with inter-connections inside a chip.

"In one program the conventional aluminium conductor layer was replaced by the multilayer novel metal structure —

platinum/titanium/platinum/gold," he said.

But special techniques for depositing and patterning such materials had yet to be established locally even though they were in place overseas.

● ANOTHER innovative program was developing techniques to taper the profiles of etched oxide steps on chip surfaces.

These techniques reduced failure rates because metal voids were included above the steps.

● **FURTHER** programs had introduced silicon nitride and polycrystalline silicon as enhancements for local processing techniques and had studied the effects of packaging on chip reliability rates.

"Australian high-reliability integrated circuits have, as a result of these programs, shown results exceeding the highest reliability standards specified in US military specifications."

## **CHALLENGE**

The nature of the local microelectronics industry placed an emphasis on the quick development and production engineering of new integrated circuits at an economic price.

A direct response to this challenge was the development of locally designed gate-array chips.

But a more general response was the intensive activity under way on the local scene in computer aided design, and each of the major microelectronics centres in the country was stressing this new technology.

"The research establishment here tends to assemble hardware and software facilities from diverse sources including those developed in-house," he said.

The largest part of the CSIRO's microelectronics effort was dedicated to the field of design automation.

Professor Rigby stressed that computer-aided design was "one of the most active and important fields in current microelectronics development."

## **Microchip Developments**

Canberra THE AUSTRALIAN in English 25 May 82 p 20

[Article by Nicholas Rothwell]

[Text] THIS month has marked an up-turn in the long-term prospects for the local computer, semiconductor and high-technology manufacturing industries, with the success of two major international gatherings devoted to computer research and development.

At Sydney's ANZAAS Congress a wide range of speakers reported on Australian innovations in computing, while noble attempts were made by government and industry experts to frame a co-ordinated policy for the future.

In Adelaide, at the Microelectronics 82 meeting staged by the Institution of Engineers, the world's leading VLSI chip designers met to assess the CSIRO's pioneering multi-project chip venture.

The man behind the new CSIRO program, Dr Craig Mudge, who is internationally respected as a computer expert able to achieve swift

and practical results, has clearly won the hearts of the visiting European and American leaders in the field of Very Large Scale Integration (VLSI).

The Adelaide meeting, as distinct from the annual ANZAAS Congress, was marked by an almost feverish enthusiasm, with many of the overseas speakers staying on for week-long design workshop sessions with the elite corps of chip designers now being assembled around Dr Mudge.

Although microchip design is a question of intellectual rigor, and a nation's program cannot be launched just by throwing money into an ambitious venture, the CSIRO effort will need extensive backing to fulfil its potential.

This was repeatedly stressed by the foreign speakers at the Adelaide conference.

And their insistence that more spending is essential, together with the opportunity now before the CSIRO team to get in on the ground floor of the new technology,

will lend Government decisions in this field a central importance.

It was against this background that Dr Mudge left the Adelaide meeting to present a paper to the assembled policy planners and Department of Science and Technology experts represented at the ANZAAS Congress.

He explained in detail to the ANZAAS delegates the

conclusions that form the presupposition of the Adelaide group — that VLSI computer technology has made feasible the fabrication of chips packed with 100,000 transistors.

"The steady increase in density of transistors per chip shows no signs of slowing — by the end of the decade we expect to be designing single-chip structures containing one million transistors," Dr Mudge said.

## **DESIGN**

But he warned that "escalating design costs" were hindering the full application of the new technology.

Even in the development of the previous generation of LSI chips, design periods of 50 man-years had been common.

"If design methodologies are not improved, we face the cost of 1000 man-years per chip — which would make development prohibitive for all except those designs sold in ultra-high volume," he warned.

This admonition could be seen as a thinly-veiled call for more support for the CSIRO VLSI Division, since the realities of the international semiconductor market dictate that Australia can only compete in specialist niches of the VLSI chip sector.

"VLSI is a statement about design complexity, not about transistor size or circuit performance.

"VLSI is a technology capable of creating systems so complicated that coping with the raw complexity overwhelms all other difficulties," he explained.

He told the ANZAAS meeting that a standard VLSI chip database would contain between five million and 15 million bytes of information, and that new design methodologies, computer aided design tools and design representations were being invented.

Existing medium and large scale integration (MSI and LSI) computer aided design (CAD) programs took too

long to be applied to VLSI, so that some design techniques had to be extensively adapted, while others would have to be completely rebuilt.

Special hierarchical design techniques were being developed to help in the task of designing the intricate new chips.

Earlier in the week, Dr Mudge had proudly presented Australia's first Multi-Project Chip (AUSMPC) implementation system, before one of the pioneers of VLSI technology, Professor Carver Mead of Caltech.

Dr Mudge also acknowledged the support and encouragement from another pioneer of the field, Professor Lynn Conway, and Mr Alan Bell of the Xerox Palo Alto Research Centre — indicating that the new CSIRO program has at last linked Australia to the frontiers of international computing research.

Extensive instruction courses in VLSI design are now under way in Australia.

And the multi-project chips are being developed in Adelaide for use in a wide variety of devices, including sensor arrays, several different digital filter designs, a multi-channel analyser, a radio-astronomy signal processor and a testable programmable logic array.

A second multi-project chip venture will be mounted late this year and two or three MPC runs will be mounted in 1983 and 1984.

Dr Mudge told the Adelaide conference the introduction of the Division of Computing Research's VLSI Program had led to a "radical increase" in the number of integrated circuit designers in Australia.

## **DIRECTION**

"The decision to commit resources in our CSIRO program to design and implement AUSMPC was not taken lightly — but we saw no alternative, since there are only two MPC implementation systems available to the independent designer.

"In these, fabrication would be carried out in the US.

"But we wish to use Australian capabilities wherever possible, so we have chosen to design our own implementation system," he said.

Cost savings would be

achieved by having up to 40 independent designs sharing one chip fabrication run, since the same chips, wire-bonded differently, could be used in different applications thanks to the advances made in VLSI architecture.

The direction of progress in microelectronics had produced a need for complete

application systems to be designed on silicon chips.

The CSIRO program has created a chip implementation system for rapid fabrication of experimental designs.

This has cut the cost of production to one-tenth of the previous standard, simply by combining the pattern-generation files of many independent chip designs to form a single mask set for manufacture.

Dr Mudge told the meeting that standard processes used for MPC designs had tended to rely on "more relaxed design rules" than leading-edge production processes, and this relaxation of rigor could mean a cut in performance standards of a factor of four.

"Designers of systems on silicon will reach the point where, in order to produce competitive products, they can no longer tolerate such penalties," he said.

# UPGRADING, COMMERCIAL USE OF LANDSAT STATION PROPOSED

Canberra THE AUSTRALIAN in English 27 May 82 p 15

[Article by Jane Ford]

[Text]

INDUSTRY's campaign for the upgrading of the Australian Landsat station gained a two-edged sword last week with the release of the Australian Science and Technology Council's report on earth resource satellites.

The report, while strongly backing industry calls for the station to be upgraded this year, maintained there was a case for the sale of the station to commercial interests even before the upgrade.

Mining and industry groups, represented by Indusat, have been pressing hard for the last year for the allocation of \$6.5 million in this year's Budget for the upgrade so the station can receive data from the new Landsat-D satellite to be launched later this year.

But they are also totally opposed to any sale of the station at present on the grounds that the industry is at an early stage of development and operation of the facility would be uneconomic without massive price rises.

They insist the station should be seen as a national facility, serving all sectors of the community, in a similar way to the Division of National Mapping or the Bureau of Meteorology.

Dr Dick Walker, the president of Indusat, maintains that any sale to private enterprise would result in product prices rising four to five

times, effectively removing all university and State Government users from the market.

The mining industry would be the only group that could still afford to use the facility.

He says the use of Landsat imagery in Australia is still at a very early state of development and with the agricultural market only just under way any increase in prices could stifle potential demand.

All other Landsat facilities in other countries were government-owned and in Canada, where the Government sold its station to private enterprise, it had been forced to buy it back.

But ASTEC maintained in its report that these arguments did not preclude the Australian station eventually being owned and operated by private commercial interests, provided appropriate regulations and guarantees existed to safeguard users.

It appeared feasible both to price the products for full cost recovery and to transfer ownership to private industry.

It argued that there was some case for a sale before the upgrading and recommended that the Minister for Science and Technology examine the possibility.

But it did stress that any decision to sell the station should not interfere with government moves to upgrade the station.

The danger is that, with the Government's present policy

of selling anything it can to the private sector, the ASTEC suggestion could stall the whole project.

But this does not seem to be the intention of the report, which stresses the urgency of the upgrade and maintains that it is essential that the contracting process begin this year if the station is to be ready to receive data by 1985.

"If the Australian Landsat station is not upgraded the existing type of Landsat information will cease to be available towards the end of this decade, and it will be impossible for the station to receive any data from the new generation of satellites."

It warned that if a decision was deferred until Landsat-D was launched and operating satisfactorily, benefits, including cost savings, would be delayed for up to two years.

Moves to upgrade the station are also supported by Mr Don Gray, the director of the station, who points out that the Australian Government has already invested \$4.5 million in the station and if upgrading does not start this year, much of the impetus will be lost.

Overseas resource companies also will have access to data unobtainable in Australia, giving them a substantial advantage in resource exploration.

"I think it is inevitable that we are going to have to upgrade the station and the sooner we do the better. The longer the delays, the more

expensive it will become and the longer the user community will have to wait for the information," he said.

But one of the crucial issues is whether the station could be an economic proposition to private enterprise and the answer, at present, seems to be a definite no.

Despite early hopes that the station would be able to cover its operating costs through sale of Landsat products, only about 35 per cent of the costs are being recovered.

Mr Gray says that a substantial price rise will be inevitable later this year, followed by further rises next year, but these will be aimed at cost recovery, not making a profit.

CSO: 5500/7548

# SPECIFICATIONS OF UNDERSEA CABLE TO CANADA REPORTED

Canberra THE AUSTRALIAN in English 31 May 82 p 20

[Text]

AUSTRALIA'S major contribution to the \$400 million ANSCAM cable system linking Australia, New Zealand and Canada was opened on Friday by the new Minister for Communications, Mr Neil Brown.

Mr Brown opened a specially constructed \$10 million facility which will produce some 500 of the 1000 repeaters required in the 14,000km of cable.

The 2000 sq m facility was built by STC inside its existing 6000 sq m factory at Liverpool, on the outskirts of Sydney.

The technology involved in the manufacture of the cable repeaters is so advanced that Australia is only the fifth nation to have it. The other four are the UK, the US, France and Japan.

The facility is a specially engineered "clean area" which is designed to be cleaner than a hospital operating theatre.

Special air-conditioning and filtering extracts all dust larger than six microns (a micron is a millionth of a metre).

Staff wear special clothing to avoid bringing dust into the area. Make-up, smoking and eating are forbidden in the working area.

The clean area is necessary because the repeaters have to work at the bottom of the ocean for a quarter of a century without maintenance.

The outer high tensile steel cylinder on each repeater is impregnated with zinc for corrosion protection.

All steel parts are given thor-

ough ultrasonic and X-ray examination before acceptance.

All electronic components are individually numbered and tested so that if one part gives trouble all the others from that batch can be found and tested.

All joints are to be X-rayed in three dimensions. All soldering points will be inspected through magnifying glasses.

Sub assemblies are subjected to high pressure testing.

The completed repeaters are stored in a cold room at 2 degrees celsius for 28 days under constant electronic monitoring before acceptance.

Testing of the equipment at all stages of manufacture is controlled by a team of specialists from the Australian Overseas Telecommunications Commission which has management control over the whole program.

The permanent OTC team will be inspecting parts, processes, sub assemblies and final assembly.

Each repeater is accepted only after a senior OTC official has examined a thick wad of documents which record all components and process steps. These documents will be kept on file until the year 2029 at least.

OTC will be operator for the cable when the last length is laid and connected in April, 1984.

## SPUR

Australian commitment to the ANZCAN project is about half of the \$400 million total.

The 14,000km cable will pass from Bondi Beach, Sydney, to

Norfolk Island, then to Fiji, Hawaii and on to Vancouver. A spur line will go from Norfolk Island to Auckland.

Repeaters are required at intervals of about 13km to boost the communications signal.

Total Australian industry participation and offset will amount to \$78 million, with high technology contracts to Australian industry including \$39 million to STC for submarine repeater manufacture, \$25 million for offset contracts and \$12.4 million for cable materials.

After the ANZCAM contract is completed STC Australia will use the Liverpool plant for other quality electronic manufacturing tasks such as construction of earth stations for Aussat, the domestic Australian communications satellite.

It is also likely to be used for other submarine cable work in the Asian Pacific area and Indian Ocean.

The major ANZCAN contractors are Standard Telephone and Cables Ltd of the UK and Nippon Electric of Japan.

The original tenders stated that provision had to be made for participation by Australian, Canadian and New Zealand industry.

STC of the UK won a \$300 million contract to supply and install the cable segments between Sydney and Vancouver.

Nippon Electric won a \$30 million contract for the 1370km spur from Norfolk Island to Auckland.

Nippon's commitment to Australian content is in the form of purchase of raw material, including polyethylene.

ANZCAN will have more than 1300 voice grade circuits, some 16 times the capacity of the Compac cable it will replace.

OTC said international telecommunications were growing at about 30 per cent a year.

CSO: 5500/7549



BRIEFS

CABLE TO SE ASIA--Perth could be the starting point for a major new undersea communications cable linking Australia with South-East Asia, India, Africa, the Middle East and southern Europe. The cable would be one of the first to use the new optical-fibre technology which will revolutionise international communications in the 1990s. Development of a submarine cable system to serve the Indian Ocean region is the subject of a four-day international conference which opened in Perth yesterday. Laying a communications cable under the Indian Ocean would fill an obvious gap in the world submarine cable network. Its cost--several hundred million dollars--would be shared between the user countries. For example, the new ANZCAN cable being laid across the Pacific between Sydney and Vancouver will cost \$400 million, half of which will be paid by Australia. The Federal Minister for Communications, Mr Brown, said yesterday that Perth could once again become a key point for Australia in a major telecommunications network across the Indian Ocean. Opening the conference, he said that 80 years ago Perth was the landing point for telegraphic cables from Europe via the Middle East, South East Asia and the Cape of Good Hope. [Text] [Perth THE WEST AUSTRALIAN in English 25 May 82 p 32]

KALBARRI SATELLITE TV--Sunday, May 9, was the official day Kalbarri received its first television satellite receiver broadcast. Locals sat down to their first taste of clear television over the weekend while technicians finished work on the receiver. Kalbarri will now receive the ABC on Channel 9 of their television sets. Unfortunately the satellite receiver will interfere with the reception of Channel 11 from Geraldton, depending on where people live in relation to the receiver. The former cost of having television in Kalbarri was expensive. The high antenna and booster needed to pick up reception cost \$466. Even with these costly aids good reception depended mainly on good weather.--Melanie Glass. [Text] [Perth THE WEST AUSTRALIAN in English 20 May 82 News of the North p 2]

CSO: 5500/7548

## BRIEFS

ALIPORE TELEPHONE EXCHANGE--A new telephone exchange with an initial capacity of 2,000 lines will be installed at Alipore during the current month. The number of lines will be increased to 3,000 during the next few months, according to a Government Press release issued in Calcutta on Friday. A second new exchange with 7,000 lines will also be set up at Tirettabazar towards the end of the year. Some of the existing exchanges will be expanded to meet the growing demands of telephone subscribers. The number of lines of the 48 exchange at Kalighat will be raised from 2,000 to 3,000 by October, followed by expansion of the 54 exchange at Baghbazar from 3,000 to 4,000 lines during the same month. In addition to the installation of a new central exchange with 1,000 lines, the Calcutta Telephones authorities have planned to expand the 42, 72 and 77 exchanges. [Text] [Calcutta THE STATESMAN in English 5 Jun 82 p 4]

MORE INSAT USE--NEW DELHI, June 8--Hyderabad and Ahmedabad stations of All India Radio are relaying national news bulletins and other programmes beamed through INSAT-1A. The satellite link facility is being used by AIR from 7 a.m. to 9.15 a.m. and between 7 p.m. and 9.30 p.m. This time constraint is due to the non-deployment of the solar sail of the satellite. Receiving facilities are being provided to 12 other stations including Gauhati and Srinagar to have INSAT link. The quality of transmission is found to be far better than that of the short-wave relay. The INSAT-link programme is being implemented in collaboration with the Department of Space and the P and T Department. [Text] [Madras THE HINDU in English 9 Jun 82 p 16]

WESTERN NEWS IN INDIAN MEDIA--More than half the foreign news items in the Indian media are either from or on Asia discounting the general belief that western countries dominated news coverage, reports UNI. A study of "foreign news in Indian media" conducted by the Indian Institute of Mass Communications (IIMC) revealed that news about the developed world--North America and Western Europe--accounted for only one-fourth of the total foreign news in the newspapers. News from West Asia and Africa together got one-fifth of the space taken by foreign news items. Latin America was the least covered region of the world. The study found that about one-fourth of the total news time over All India Radio was devoted to foreign news. Doordarshan devoted more time, nearly one-third of its news time, for foreign affairs. Indian news media continued to depend heavily on foreign sources like the Reuters and Associated Press. Their contribution of foreign news in the Indian press was about 15

per cent each while that of UPI, Tass and AFP was negligible. A fair share of news originated from other foreign national media. According to the study, the contribution of Indian correspondents based abroad was "fairly substantial" Political news dominated foreign coverage with crime claiming a significant share in news reporting from all regions especially Western Europe. [Text] [New Delhi PATRIOT in English 12 Jun 82 p 5]

TEAM TO MALTA--A four-member Indian delegation led by Deputy Minister of Information and Broadcasting, Arif Mohammad Khan, left Delhi on Sunday for Malta to participate in the sixth meeting of the non-aligned inter-governmental council for coordination of information and mass media, reports PTI. Other members of the delegation are Mr P Unnikrishnana, deputy general manager of Press Trust of India Mr J K Bhattachar ya Joint Secretary Ministry of Information and Broadcasting and Mr Mani Shankar Iyar, Joint Secretary (XP), Ministry of External Affairs. [Text] [New Delhi PATRIOT in English 15 Jun 82 p 5]

CSO: 5500/7161

## BRIEFS

NEW EARTH STATIONS IN SOUTH SULAWESI-- In Rantepao, Tanatoraja, South Sulawesi, Communications Minister Roesmin Nurjadin recently declared operational five small earth stations (SBK) as part of the Palapa satellite communications system for this region. The five are part of the 72 similar SBK which are to be built throughout Indonesia and which will augment the 50 existing SBK. Construction of 72 SBK originally planned to be completed prior to the 1982 election was delayed several months because of technical difficulties in transporting equipment to the scattered sites, most of which are in remote areas and all are outside Java. In addition to the five SBK for the South Sulawesi area which were dedicated last Tuesday [18 May], seven SBK were dedicated earlier for the Aceh region, five for the Maluku region, and two for the Central Sulawesi region. Thus 20 [as published] of the 72 planned SBK have been dedicated. With the dedication of these five SBK, the communications minister said, all of the South Sulawesi region is covered by the Palapa communications system as well as the Indonesian short-wave communications system for the eastern portion of the country. Along with the construction of the five SBK, PERUMTEL [Telecommunications Corporation], which handles the national communications system, has installed 1,100 telephone connections (SS) in South Sulawesi, broken down respectively into 100 SS in Rantepao, 450 SS in Watampon, 100 SS in Enrekang, 100 SS in Sinjai, and 300 SS in Palop [as published]. These are cities in which SBK are located. With this new construction, the South Sulawesi region now has 25 manual telephone centers with 3,490 SS, three automatic telephone centers with 13,200 SS, 28 telegraph service centers, and one telex office with a 500 SS capacity. [Excerpt] [Jakarta HARIAN UMUM AB in Indonesian 22 May 82 pp 1, 11] 6804

ACHE TVRI TRANSMITTER STATION--The director general of radio, television and film, Sumadi, today inaugurated a TVRI transmitter station in Langsa, Aceh special district in North Sumatra. The transmitter station has a capacity of 100 watt [as heard]. With the functioning of this station, the number of television transmitter and relay stations throughout Indonesia totals 150. The government in 1982 plans to complete the construction of 70 other television transmitter stations. [BK080711 Jakarta Domestic Service in Indonesian 1200 GMT 4 Jun 82 BK]

CSO: 5500/5855

SRI LANKA

BRIEFS

EMERGENCY MICROWAVE LINK CONTRACT--A contract was signed recently for the supply and commissioning of a mobile emergency microwave link by the Sri Lanka Telecommunications Department and TRT, France. Picture shows Mr. A. Shanmugarajah, Director of Telecommunications, and Mr. H. Ploeger, Export Sales Group Manager, signing the contract witnessed by Mr K. Jayabalasubramaniam, Chief Engineer, SLTD, Mr. O. Guvenek, Area Sales Manager, TRT, and Mr. J.C.A. Motha of Maurice Roche and Co. Ltd., local agents. The purchase is financed under the French protocol and is valued at approximately 1.5 million francs. [Text] [Colombo DAILY NEWS in English 16 June 82 p 15]

CSO: 5500/5852

POOR TELEPHONE COMMUNICATIONS CRITICIZED

Sofia TRUD in Bulgarian 2 Jun 82 p 2

[Article by Asen Petrov: "This Is No Simple Matter"]

[Text] The telephone has long stopped being a luxury. Today it is as necessary to the economic manager as it is to the public figure and to the simple citizen. It is no accident that in recent years the development of telephone communications reached an unparalleled level. Even the small villages have their automated exchange. This is an unquestionable success but, alas, telephone services cannot be considered part of it. Frequently we have to dial dozens of times before a communication can be established. Everyone is familiar with the innumerable technical defects such as busy signals, dead lines, lines, crossed wires, etc. They are all explainable in terms of overloaded circuits, poor cable insulation, exchange defects, and so on. This is indeed so. Despite the decisive improvements in our electrical engineering industry, it is still producing defective equipment, telephone sets in particular.

Is this the only trouble?...

Is Automation to Be Blamed?

The large number of new direct-dial exchanges and the steady expansion of the older ones created a large disproportion between the number of existing telephone sets and the handling capacity of interurban and interconnecting cables [incomplete sentence] resulted in the fact that a number of switchboards found themselves disconnected even from the settlements in their own okrug, not to mention interokrug dialing.

The motivation for such hasty automation is the fact that the installation of an exchange and new telephone sets yield quick profits, whereas work on trunk and interconnecting cables requires more labor, condensation systems, maintenance, etc. The Mladost I, II and III and Lyulin Complexes in Sofia became victim of such disproportion: thousands of sets were installed in the homes of their residents without securing reliable connections with other circuits. It is still difficult to connect a subscriber with exchanges within the 2, 3 and 5 exchanges, and it is almost impossible to do so from exchange 67 and other suburban exchanges.

Similar difficulties exist elsewhere in the country as well. A number of exchanges have been installed in Gotse Delchev, Razlog and Petrich. However, the cable linking them with Blagoevgrad, the okrug center, is 17 km short of completion due to lack of funds and materials. The Ivaylovgrad and Krumovgrad areas have found themselves isolated for the same reason.

The consequences of such thoughtlessness are clear: Bulgaria is in one of the last places in terms of the average use of its telephone system and the trend in this area is worsening. Whereas the level of utilization of first class circuits was 29.08 percent in Blagoevgrad Okrug in June 1980, in June 1981 it had dropped to 26.10 percent. The situation with second class communications is even worse, having dropped from 30.46 to 24.56 percent. Meanwhile, hundreds of requests for long distance talks were not met by the telephone service of the okrug center alone: 157 in July 1981 and 126 in August; in a single day 11 international communications could not be established. However, these are relative figures, for the telephone operators refused to accept a number of requests, while others were cancelled by citizens who had run out of patience. Meanwhile, the okrug was unable to fulfill its plan which had to be amended.

Some okrugs are already boasting of having more than 25 sets per 100 population, whereas others, for better or for worse, have less than 10. There have also been extremes -- materials allocated for planned repairs and preventive maintenance have been channelled into new construction and the installation of so-called distant sets.

Another question arises as well: was it right to install 1929-model exchanges so quickly? It is true that they have been improved and are quite different from their prototype of 53 year ago, but their main feature -- mechanical dialing -- has remained. Yet it is precisely at this point that the difficulties begin -- much labor and time spent on maintenance, frequent change of operators, a large number of personnel, etc. It took 14 years before the use of the imported license for Crosspoint semielectronic dialing could be mastered. Meanwhile, it too became morally obsolete... Therefore, we shall have to cope with old-fashioned equipment, with all of its negative consequences, for quite some time.

#### Quality Is for the Indefinite Future...

Let us not blame only the obsolete equipment for the poor quality of telephone services. According to the rules of the Ministry of Communications every okrug has an acceptable tolerance of 15 percent of faulty telephone sets and installations. This means that if there are about 20,000 telephone sets in a given okrug, even if 3,000 of them are always defective the personnel in charge will receive remuneration for excellent quality work. If the 15 percent figure is reduced (it is 17 in some okrugs, while Kurdzhali has set the record with 25 percent), all is well. However, even that is arbitrary, for a trunk or settlement cable torn as a result of careless construction work rises the percentage figures even higher.

The situation is slightly better in Sofia, where a great deal of funds and forces are being invested -- here the figure is under 10 percent. A ministry

document dated November 1981, officially acknowledges that communications are result in no more than 35 percent of dialings (let the readers judge for themselves if such is the case), and sets the task of reaching the 50 percent mark in the near future. In turn, the Sofia telegraph and telephone exchanges assumed the obligation to reach that level by 1984. However, bearing in mind the state of some exchanges and most of the grid, it is hardly likely that the deadline will be met. The results of such a high rate of defective telephone sets and equipment can only be negative. It is no accident that once again concern was expressed at the July 1981 conference of okrug communications directors in Blagoevgrad, to the effect that the regulations are not encouraging efforts to improve quality and that income remained the main concern. This question has been vainly raised a number of times.

No one is denying that the ministry and its branches are making efforts to break that circle of contradictions. Measuring equipment for the automated testing of the A-29 exchanges is being procured (here as well there have been delays). New trunk lines and interconnecting cables are being laid at a fast pace. However, these measures apply essentially to the capital, while the okrugs have been given second priority, although we know that a telephone communication with Varna, Silistra, Vidin or Pleven does not depend exclusively on the equipment in Sofia. Obviously the matter of quality will remain a topic for discussion in terms of the future because of faulty estimates.

Some of the facts cited here may astound us. However, the truth remains the truth, regardless of how we accept and interpret it. Our country is in the midst of a reorganization in planning and distribution of labor results. This gives us the right to apply the requirements of the economic approach to communication services as well.

5003  
CSO: 5500/3012



COLOMBIA

BRIEFS

M-19 INTERRUPTS TV BROADCAST--A new interference on TV channel 1 by the M-19 was registered last night. "Radio Venceremos Television," broadcasting organ of the subversive movement, intercepted the signal of channel 1 at 8:30 pm and a male voice read the communique, made known Friday by EL TIEMPO, by means of which it was decided to suspend military activities until 20 June, when the state of siege will be lifted. The radio announcer of the movement slowly read the announcement and to conclude, as in previous occasions let the national anthem be heard. [Text] [Bogota EL TIEMPO in Spanish 13 Jun 82 p 14-A] 9678

CSO: 5500/2274

SELF-SUFFICIENCY IN RADIO, TELEVISION SETS BEING PLANNED

Tehran KEYHAN in Persian 7 June 82 p 15

[Interview with Engineer Mohammad Hasan Katuzian, business manager of the National Organization of Industries]

[Excerpts] 'So long as a people insofar as its concerns themselves do not change their way of thinking, expression and action, the Almighty will not change their condition.' 'Television must become the biggest university.' (Imam Khomeyni).

Radio and television are the most important and most effective means of mass communication for directing and expanding the cultures of established social orders in the world. With this importance in mind, all governments try to encourage their societies to benefit from radio and television and even spend large sums of money toward this end. Space communication satellites and numerous private television channels which are subsidized by governments attest to the importance of the matter.

Unfortunately the despicable Pahlavi regime used such mass communication media only to propagate antipopular culture and to create corruption in order to support its dirty objectives for strengthening the basis of its straw rule. Luckily, with the fruition of the Islamic Revolution under the directions of His Holiness Imam Khomeyni, radio and television can play its fundamental role of propagating and promoting Islamic culture and creating important changes in the evil-ridden public culture, thus spreading Islamic culture, carrying the voice of the revolution to far corners of the earth and as the Imam of the people has said to turn television into the biggest Islamic university.

In its reports on nationalized industries, the economic section of KEYHAN this time has, in the assessment of the importance of domestic production of radio and television sets, the production situation and efforts under way by industrial managers to achieve the Imam's goal of selfsufficiency, had a discussion with the managing-director of the National Organization of Industries [NOI] at the Pars Electric Factories. Engineer Mohammad Hasan Katuzian listed the following 6 plants presently manufacturing radio and television sets:

Name of Company	Managed by:	5-year foreign exchange use	Number of Employees	TV Production:	
				Colored	B&W
Pars Electric	NOI	11,431,082,400	2,500	185,649	780,746
Radio Electric (Philips)	Foundation of Oppressed	2,591,000,000	700	17,278	294,148
National	Private	4,000,000,000	320	24,500	158,000
Belmond	NOI	413,000,000	317	20,196	33,480
Radio Shahab	Martyrs' Foundation	1,000,000,000	250	5,932	78,165
Blair	Government	939,000,000	200	16,944	43,171
Totals:		20,374,082,400	4,287	270,499	1,387,710

The above-stated set production figures are for the period 1355 to 1360, i.e., 21 March 1976 to 20 March 1982. Production of radio sets for the same period were:

0113	Pars Electric	323,420 sets
0117	Radio Electric	75,368 sets
0121	National	243,500 sets
0126	Total:	642,288 sets

#### Manufacturers' Proposals

The country's present radio and television manufacturers have put forth proposals concerning the problems and difficulties of the industry in the hope that they will be considered by responsible authorities. Some of the proposals are given below:

#### Halt Color TV Production Until Foreign Exchange Situation Improves.

In view of the fact that foreign exchange needed for a color television set is eight times more than similar exchange needed for a black and white and the fact that the color set sells for three to four times the price of a black and white, it follows that color television sets are bought by the affluent class and urban dwellers while because of cheaper prices black and white sets are generally bought by those of modest income and mostly by rural residents.

In order to create more jobs and to hold foreign exchange outlays to a minimum, the production of color sets should be halted and of necessity a portion of the 1359 [21 March 1980-20 March 1981], color television foreign exchange allotment be diverted to black and white production needs. Thus, more jobs will be created by set manufacturers and more families will be able to benefit.

#### Increased Production of Radios

Bearing in mind that the radio is a relatively inexpensive means of communication and may be used everywhere and fortunately our entire Islamic country is covered by the republic's radio network which carries the message of the revolution to all corners of the Islamic domain. Therefore, the responsible

authorities must help radio manufacturers in the designing, make and production of radios. It is to be borne in mind that the foreign exchange needed in the production of a radio set is the equivalent of 350 rials and a little study shows what constructive and effective role the expenditure of this amount of foreign exchange will have on society, in spreading and promoting the culture of the revolution, and in eliminating shortages of this item.

#### Banning Television, Radio Imports

All manufacturers request the proper authorities, particularly the committed brothers in the Ministry of Commerce, to bear in mind the possibility of increased domestic production and to bar the import of assembled television and radio sets. Also, in view of foreign exchange limitations, to allot needed foreign exchange to manufacturers for the import of parts and equipment, thus helping in the utmost use of available capital and in preventing workers of factories from losing their jobs.

#### Eliminating Expansion Permits

According to a Single Article of Law concerning the expansion of the country's television networks in 1355 [21 March 1976-20 March 1977], domestic television manufacturers have been required to pay a sum of money to help expansion projects to the national network. Specially in the past 3 years, manufacturers have been faced with various difficulties and because of straitened circumstances have not been able to pay such sums and as a result owe huge sums of money to the Voice and Vision of the Islamic Republic. In view of all difficulties, cash flow limitations, rocketing current costs, the government control umbrella over most corporations and the hardships such payments will cause manufacturers, it is hereby proposed that the Voice and Vision of the Islamic Republic of Iran should take this matter under serious consideration and as far as possible help continued production and prevent loss of jobs by waiving the outstanding amounts.

#### Elimination of Technical Aid Charge

Under contracts that local manufacturers had signed with foreign companies prior to the revolution they were required to pay technical assistance charges according to production ratios. These were generally large amounts which imposed a severe foreign exchange burden.

Because of the exploitive and noncomparative nature of the contracts under present conditions of the Islamic Revolution, the proper authorities are hereby asked to help in halting such agreements.

#### Establishment of an Independent Research Center

It is hereby proposed that a strong research center be established under independent management with the participation of all radio and television manufacturers, as well as companies and organizations connected with this industry so that they can conduct continued research in design and manufacture and provide a solution of the industry's present technical difficulties.

## BRIEFS

TELECOMMUNICATIONS NETWORK--Madani, June 3 (SUNA)--Central Region Governor Abdel Rahim Mahmoud ['Abd-al-Rahim Mahmud] inaugurated here yesterday morning the telecommunication network of the Region's areas which was implemented by the Sudan News Agency in collaboration with the Region's Affairs and Administration Ministry. The Governor also inaugurated the first stage of the modernization project of SUNA's teleprinting system here. He further conducted wireless calls with the Commissioners of the Blue and White Nile Provinces and congratulated them on that help in quick decision-making and implementation. The Governor then used the teleprinter system and cabled SUNA General Manager Mustafa Amin commending the great achievements realized by SUNA in the field of promoting Regional telecommunication. He stressed his appreciation and gratification for SUNA's achievements in the Central Region. Amin praised the existing cooperation between SUNA and the Central Region's Government and expressed confidence that cooperation would continue for further accomplishments and develop the Region. At the outset of the inaugurate ceremony, the Minister of the Region's Affairs and Administration Saed Awad [Sa'd 'Awad] spoke of the importance of the network and said the network was one of the remarkable achievements of the Regional Government. The Minister also said that next year would witness the opening of the Region's Radio station and the coloured photography studio. Concluding his address the Minister thanked the Governor for his dedication. He also thanked the Regional Ministers of Finance and Housing and Construction. [Excerpt]

TELEPHONE EXCHANGE--The new automatic telephone exchange control centre of Sinjah was opened here yesterday. Trial runs on the 300 line control centre had been going on since last April. [Text] [Khartoum SUNA in English No 4147, 5 Jun 82 p 4]

CSO: 5500/5011

## ETHIOPIA

### BRIEFS

ASMARA, MASSAWA TELEX SERVICE--Addis Ababa (ENA)--The Ethiopian Telecommunications Service has linked for the first time Asmara and Massawa with an automatic telex service. The newly installed automatic telex service which facilitates direct call has cost 310,512 Birr to set up. The Authority has plans of creating similar links between Assab and Dire Dawa and other towns. There are 65 telex clients in Asmara and eight in Massawa. The Authority advised clients here that contact with either Asmara and Massawa can be had by adding number four to the existing number. The Authority stressed the importance of telex service for carrying out commercial and government activities and particularly noted its immense contribution in the implementation of the Red Star Multi-faceted Revolutionary Campaign. [Text] [Addis Ababa THE ETHIOPIAN HERALD in English 12 Jun 82 p 1]

CSO: 5500/5839

# ALOMBIE RELAY EQUIPPED WITH SOLAR GENERATOR

Libreville L'UNION in French 16 May 82 p 4

[Article by Neltoh: "Alombie Relay Equipped with Solar Generator"]

[Text] It would be tempting to say that solar energy is on the way to replacing the other energy sources (electric or thermal) currently used in our country. However it is too early to go that far.

What is true is that solar energy is becoming more and more important in Gabon's energy policy. Last 6 May an official ceremony took place at the Postal and Telecommunications Office (OPT), attended by the Minister of Information, Postal Services and Telecommunications, Mr Zacharie Myboto, and the French ambassador to Gabon, Mr Robert Cantoni. These two dignitaries signed the document transferring the solar generator at Alombie, between Port-Gentil and Lambarene, from the French Government to the Gabonese Government.

Why a solar generator? Actually, the microwave links of the national network (the Libreville-Franceville and Libreville-Lambarene-Port-Gentil lines), jointly run by the OPT and the RTG (Gabonese Radio and Television) include many relays supplied by thermally-originated electrical energy. The generators are built of gas turbines which function continuously. The stoppage of any turbine causes the link to be cut immediately, with consequent total interruption of television broadcasts and telephone and telex communications.

For obvious technical reasons, the relays are installed at high altitude sites, and ground access to them is generally difficult. Thus supplying them with gas is irregular and costly. Risks of breakdown or interruption of operation are factors of relatively great importance. To circumvent these difficulties, it was necessary to increase considerably the links' reliability by making the best possible use of new technological information, particularly the replacement of thermal generators by photovoltaic generators which convert solar energy directly to electrical energy.

This is a reality today with the solarization of the Alombie relay, financed in the amount of 20 million CFA francs by the Aid and Cooperation Fund (FAC) within the framework of a nonreimbursable grant. In the technical area, this achievement was followed by the Solar Energy Commission (COMES), with the participation of the Photowatt International Corporation, who provided the equipment, and the Elf Gabon Corporation, which set it up and monitored it for a year.

The French Cooperation Mission confirms that a 750-watt generator was installed on 24 April 1981 and permanently commissioned on 27 April 1982 after 1 year of operation without any failures. During the course of this first year, a Gabonese engineer from the OPT was trained so that he could be responsible for the system's maintenance. This first experiment completed on the part of the Postal and Telecommunications Office of Gabon is novel in that it shows the possibility of making practically autonomous a microwave link power plant which until then had received its energy supply from a thermal gas generator, and is in an area which is difficult to reach and far from any city. If it does not allow for generalized use of solar energy, it at least indicates the feasibility of resorting to photovoltaic generators whenever the criterion of difficulty of access to the site justified it. Furthermore, OPT's 1982-83 investment programs plan for the replacement of thermal generators by photovoltaic generators on the existing relays. Also, it has been said that the future radio relay of Port-Gentil-Mayumba-Tchibamga will be equipped with some solar generators from its inception, and according to the criterion of difficulty of access to the site.

Actually, this experiment is not the first, especially as photovoltaic generators have been operating for several years in Gabon. The promoter of this new technology was Elf Gabon, almost all of whose telecommunications network installed between the exploratory and operational offshore drilling rigs, Port-Gentil and Libreville, operate by photovoltaic energy. OPRAG [Gabon Ports and Roadsteads Office] and ASECNA [Agency for Air Navigation Safety in Africa and Madagascar] also use this method to supply port and airport beacons. Experiments are going on in the areas of village hydraulics, and the electrification of dispensaries and schools. The village of Akok, between Libreville and Cocobeach, is one center for this experiment. All these facilities are characterized by their low power, on the order of about 100 watts.

Alombie's novelty is that the power level reaches about 750 watts (7.5 kw), perfectly adapted to the massive carrying of information via radio channels.

9927

CSO: 5500/5815



## MOZAMBIQUE

### BRIEFS

NEW TELEX EXCHANGE OPENS--The new Maputo telex exchange is already partially operational. It should be completely operational at the beginning of this week. At the same time as this project--which will permit the resumption of telex communications which were seriously affected by the fire at the telex exchange on 6 November 1981--efforts will also be made to expand the capacity of the exchanges in other cities of the country. "The new Maputo electronic exchange already has international outlets and we are ready to begin connections to national outlets," said an expert of that service to Radio Mozambique. It is expected that during this week the exchange will be connected to all the national and international lines, said the expert. To solve the problem of overload of the Beira exchange, he assured us that studies are in progress to expand it; this is envisaged in 1983. The same type of work will be done in the Tete and Quelimane exchanges. [Text] [Maputo NOTICIAS in Portuguese 10 May 82 p 8] 11635

CSO: 5500/5836

## NIGERIA

### BRIEFS

AEROSTAT BALLOON PROJECT--A revelation by the chairman of the house of representatives committee on communications that Nigeria has been paying 10,000 naira daily since 1978 to the American firm handling the suspended aerostat balloon project worries the NEW NIGERIAN. The impression of the NEW NIGERIAN is that those Nigerians who are saddled with the project are crooks, and because the NEW NIGERIAN does not want this huge amount to continue to be wasted, it suggests that the aerostat balloon telecommunications project should be canceled immediately. [Text] [AB051236 Lagos Domestic Service in English 1200 GMT 5 Jul 82]

CSO: 5500/5846

DEVELOPMENT OF DATA COMMUNICATIONS IN 1980'S

Rome NOTE, RECENSIONI, NOTIZIE in Italian Jan-Mar 82 pp 11-20

[Technical paper by M. L. D'Atri, of the Higher Institute of Posts and Telecommunications, Rome: "Development of Data Communications in Italy in the '80's," presented at the AICA [Italian Alliance of Agricultural Cooperatives]-SMAU [Office Equipment and Machines Trade Fair], Milan, in September 1981]

[Text] Summary

The development of data communication services is currently proceeding by way of adequate telecommunications network planning as well as the systematization of specialized data networks.

To this end, the European member Administrations of the CEPT [European Conference of Postal and Telecommunications Administrations] have carried out, through the Eurodata Foundation, a study on the development of data communication services to 1987.

The main conclusions of the investigation are reported in this article. In particular, forecasts are given relative to the development of the data market in Italy, highlighting the principal fields of application.

1. Introduction

The development of telematics, like that of telecommunications and data processing, is being brought about as a result not only of current advances in the field of electronic components, but also of proper planning of telecommunications networks and specialized networks engineered to fulfill individualized service needs.

The operators of public telecommunications services, recognizing user interest in data communications, have taken various initiatives to facilitate the growth of telematics services.

The principal steps taken by the PT [Postal and Telecommunications] Administrations are linked together with the studies being conducted under the aegis of the CCITT [International Telegraph and Telephone Consultative Committee] and

the CEPT to arrive at a rapid definition of standards for packet- and circuit-switched data transmission networks, the standardization of new services (videotex, teletex), and the actualization of the ISDN [Integrated Service Digital Network] (1), (2).

Noteworthy in the European ambit are the actualization of the EURONET network (3) and the creation of an organization designated the Eurodata Foundation, whose task is to conduct and coordinate, in the name and for the account of the CEPT Administrations, studies and market surveys in the data communications sector.

The work being done on standards for data transmission networks and new services is of recognized importance to the development and growth of remote data processing services, as is also the work being done with EURONET to provide incentives to the building up of data banks and to their being more widely used.

No less important is the market study recently carried out in Western Europe under the coordinative function of the Eurodata Foundation and completed at the end of last year, a study that is enabling a deeper understanding of the reasons underlying the growth of remote data processing services, besides providing a basis for adequate planning in the engineering of specialized data communications networks.

## 2. The Eurodata '79 Study: Its Principal Conclusions

In 1978, 17 CEPT administrations, including Italy, asked the Eurodata Foundation to undertake a forecasting study of the growth of the data transmission market for the purpose of developing qualitative and quantitative information on remote data processing applications in 1979 and forecasting their growth from 1983 to 1987.

The study took on meaningful dimensions both from the standpoint of the huge volume of data processed (involving 800,000 estimates and 2,800 interviews) and from that of the special computerized operations used. The principal conclusions drawn with regard to the interested countries, taken as a whole, are the following.

The number of data transmission service subscriber NTP's [Network Terminating Points]\* will increase from 393,000 in 1979 to 1,620,000 in 1987; at the same time, the terminals using the public telecommunications services network will increase from 625,000 to 3,965,000 (a growth factor of 6.3).

The average number of transmissions of information per working day will also increase, by a factor of 7.1 to a total of 10 million transmissions a day.

The distribution of NTP's by countries will vary from the current one, owing to greater growth of the sector in those countries that now offer few remote data

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\* An NTP is defined as a point of access to a telecommunications network equipped with network terminal facilities.

processing services, but the four countries with the largest number of NTP's in Europe at present (in descending order: England, France, FRG, Italy), which together in 1979 totaled 70 percent of NTP population, will still account for 64 percent of the total in 1987.

The average value of the data communications growth index, measured in terms of NTP's per 1,000 LU's [labor units], is presently 3.5 (with a wide dispersion among the European countries, reaching a maximum of 5.7 in Sweden and a minimum of 0.27 in Portugal), a rather low value if compared with that reached in the United States (24.4 NTP's per 1,000 LU's).

As regards the distribution of NTP's by industrial sectors, it was found that in Europe the banking sector accounts for an average of 30 percent of the NTP's (in certain countries, as in Greece, that figure reaches values of over 70 percent), and the data processing service, manufacturing industry and computing service sectors each represent 10 percent of the total NTP's.

The sectors with the highest growth rates are the data processing services sector (310 NTP's per 1,000 LU's), the banking sector (46 NTP's per 1,000 LU's) and the air transport sector (20 NTP's per 1,000 LU's). The study considers these sectors to have now reached "maturity," at least insofar as concerns typical applications within the sector (Fig 2).

The study also provides an analysis of the distribution of NTP's by types of application, from which it appears that the most widespread applications are those of systemic types, such as banking transactions, administration and management, seating reservations, processing and inventory control.

These applicational sectors are very well developed and will grow at a slower rate than other applications such as the person-to-person communications and the information retrieval sectors.

This latter application will grow faster than all the others, becoming nearly 17 percent more representative.

The NTP distribution by types of telecommunications networks in use was also addressed. Whereas in 1979 the largest share of data communications was carried by leased facilities and the switched telephone network, in 1987 the new packet- and circuit-switched data transmission networks will account for almost one-third of the data market, at the expense mainly of use of the telephone network.

Heavily represented also, to the extent of approximately 50 percent, will be the use of leased facilities, especially in cases involving wideband digital transmission facilities capable of handling higher volumes of traffic.

Insofar as concerns data transmission terminals, the study took into account those in use in the public telecommunications services network.

In 1979, in the EURODATA countries, there were approximately 625,000 terminals and, according to the forecasts, this population should reach 3,965,000 in 1987,

having by then grown by a factor of 6.3, which is greater than the forecast for NTP growth, a phenomenon that is owing to the trend toward connecting more terminals to a single terminal installation so as to increase the utilization of the public transmission facilities being used.

The distribution of terminals among the various countries is shown in Table 1, and Figs 3a and 3b show, respectively, the 1979 percentages for each country of the total data communications terminals in use in all the countries, and the forecast for 1987, both as a function of the number of NTP's per 1,000 workers.

It will be noted that Italy is close to the European mean, with 50 percent of the terminals used for data communications in 1979 and over 70 percent in 1987.

Fig 4 shows the percentage of data terminals used in 1979 and 1987 for projected applications under the two headings known as "utility applications" and "systems applications."

The figure brings out the change in roles of the various fields of application of the terminals during the period under examination.

The study also includes an analysis of the variations in the distribution of terminal operating speeds, confirming the trend toward the use of higher speeds. In 1987, the most used speed categories will be 2,400 bits/sec (27 percent), 1,200 (23 percent) and 9,600 (22 percent), whereas in 1979 the most widely used was 300 bits/sec (around 37 percent). (Fig 5).

### 3. Growth of Teleinformatics Applications and Terminals in Italy

Data transmission usage in Italy today amounts to some 75,000 NTP installations. The growth rate in this sector is expected to remain very high over the next several years and, according to the Eurodata '79 study, there should be some 108,000 active NTP's in 1983 (with an average annual growth rate of around 20 percent from 1980 to 1983) and almost 195,000 NTP's in 1987 (Fig 6).

As in the rest of Europe, in Italy as well, there will be a qualitative change in the terminals inventory, stemming from an accelerated trend toward medium to high transmission speeds (2,400-9,600 bits/sec), and from a more marked orientation toward the use of alphanumerical video and person-to-person and facsimile terminals.

Specifically, the percentage distribution of NTP's by speeds will vary as shown in Table 2.

The area of 300-1,200 bits/sec speeds, which currently represents 75 percent of the terminals inventory, should drop to around 45 percent of the total by the end of 1986, making room for, in particular, the 2,400 bits/sec (27 percent) and the 4,800-9,600 bits/sec (around 27 percent) speeds.

The now consolidated trend toward the use of higher speeds must be considered in relation to the availability of more sophisticated and at the same time less expensive transmitting equipment (modems), and to the need to use telecommunications lines to better advantage, increasing the traffic handled by them.

The trend toward greater use of video alphanumerical terminals and of terminals suitable for person to person communications is correlated to the greater relative importance to be assumed by "information retrieval" and "person-to-person" applications, and to the lower cost per function performed that will ensue from the use of VLSI [very-large-scale integration] electronic components.

The projected variations in the distribution of the various types of terminals in Europe are indicated in Table 3, in which it can be seen that numerical facsimile will increase 29-fold and standard video terminals 7-fold.

Alphanumerical video terminals, which today represent around 52 percent of all terminals, will by 1987 have increased in number to represent 60 percent of the total terminals population. Teletype and batch types of terminals, on the other hand, will occupy positions of minor importance.

The change in types of terminals also reflects the altered distribution of terminals by applications.

Table 3 shows that distribution in Italy for the typical applications projected in the Eurodata study. As has already been mentioned with respect to the findings for Europe as a whole, there will be growth in the sectors of information retrieval, person-to-person, computer services and software applications.

As against this growth there will be a stabilization of general administrative applications and a contraction (in percentage terms, not in terms of absolute value) of applications such as seating reservations, and banking transactions, stemming from maturation of these sectors, which were among the first to make extensive use of teleinformatics [remote data processing] choices.

Information-retrieval and person-to-person communications applications will be favored by the introduction of the new services being planned throughout all the European countries for the years 1982-1984.<sup>(7)</sup>

Applications of the person-to-person type are quite well represented today, especially insofar as concerns the transfer of data between two batch terminals, message switching systems and analog facsimile systems. But the introduction of teletex service, now standardized within the CCITT, and of the telefax and datafax services for public network facsimile, will provide a strong impetus to such applications.

Insofar as concerns information retrieval, an application that in 1979 accounted for only 1 percent of the terminals in Italy, the setting up of the EURONET network has now opened up access to numerous scientific and technical data banks and is contributing to the development of the sector.

Undoubtedly, the most powerful stimulus will be imparted by the introduction of Videotel Service\*\*, which could bring about a lively growth of this application, with results that could exceed the projected values. The information given in Table 4 refers to professional terminals, devoted to business uses; as regards the application of Videotel Service to "home" uses, the study forecasts for Italy a total of 350,000 terminals by 1987.

To complete the foregoing data, Table 5 provides the distribution of the terminals that use public telecommunications facilities for various sectors of activities.

In Italy, the industrial sector (namely, the manufacturing and cyclical industries) is expected to increase its informatics applications from their present 18.6 percent of the total to around 23 percent by 1987; the commercial sector should increase its share to around 7 percent; while the banking sector's share is expected to decline from 40 percent in 1979 to 33 percent in 1987.

As has been mentioned, the Eurodata study also compiled data relative to the traffic generated by terminals, with growth forecasts and indications as to the principal traffic routes.

With respect to Italy, the total number of bits transmitted during an average working day, which in 1979 was 113 billion bits, is expected to grow to 830 billion bits/day by 1987.

In a general sense, three important characteristics can be identified in the current distribution of data traffic: The average usage of each NTP is high; a large percentage of traffic is carried on interurban and international trunking facilities (Table 6); this traffic is predominantly concentrated in links to or from capitals or major metropolitan areas.

With regard to the latter aspect, however, it should be noted that for the past several years a trend has been under way, confirmed by the Eurodata study, toward a decentralization of the teleinformatics market, in the form of a greater growth rate of NTP's for data transmission in the minor areas and of introduction of NTP's in peripheral areas not previously touched by this phenomenon, stemming from the trend toward distributed data processing and from the creation of land-use, registry and public health archives and data banks at regional and municipal levels (Table 7).

On the other hand, the availability of high-speed transmission facilities at reasonable cost (digital leased circuits), the performance characteristics of public data networks, such as packet-switching ones, will stimulate traffic via international trunks to the extent that international traffic in Italy is expected to increase ninefold between 1979 and 1987 as compared with a total traffic growth of 5.3 over the same period (Table 8).

As regards the characterization of the main sources of traffic, Table 9 provides a distribution by percentages of the traffic in Italy for the main applicational sectors.

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\*\* Official name for public videotex service in Italy.



#### 4. Conclusions

The data communications growth forecasts, summarily illustrated herein, render it reasonable to anticipate in our own country as well as in Western Europe as a whole a substantial growth in the sector, with characteristics such as to lend urgency not only to the need to build the essential infrastructures for the development of all telematics applications (specialized data networks), but also to the need to experiment with new services, such as Videotel and electronic mail.

The Italian PT has already gone ahead constructively in this direction. Under way now is the plan for the setting up of the public data network, a plan that provides, in its initial phase (end of 1982) for the actualization of a packet-switching network with characteristics based on the most recent CCITT recommendations<sup>(3)</sup>; Also under way is the setting up of tests on Videotel service, public facsimile services and Teletex, the latter within the framework of tests on electronic mail.

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[Graphs and tables follow]

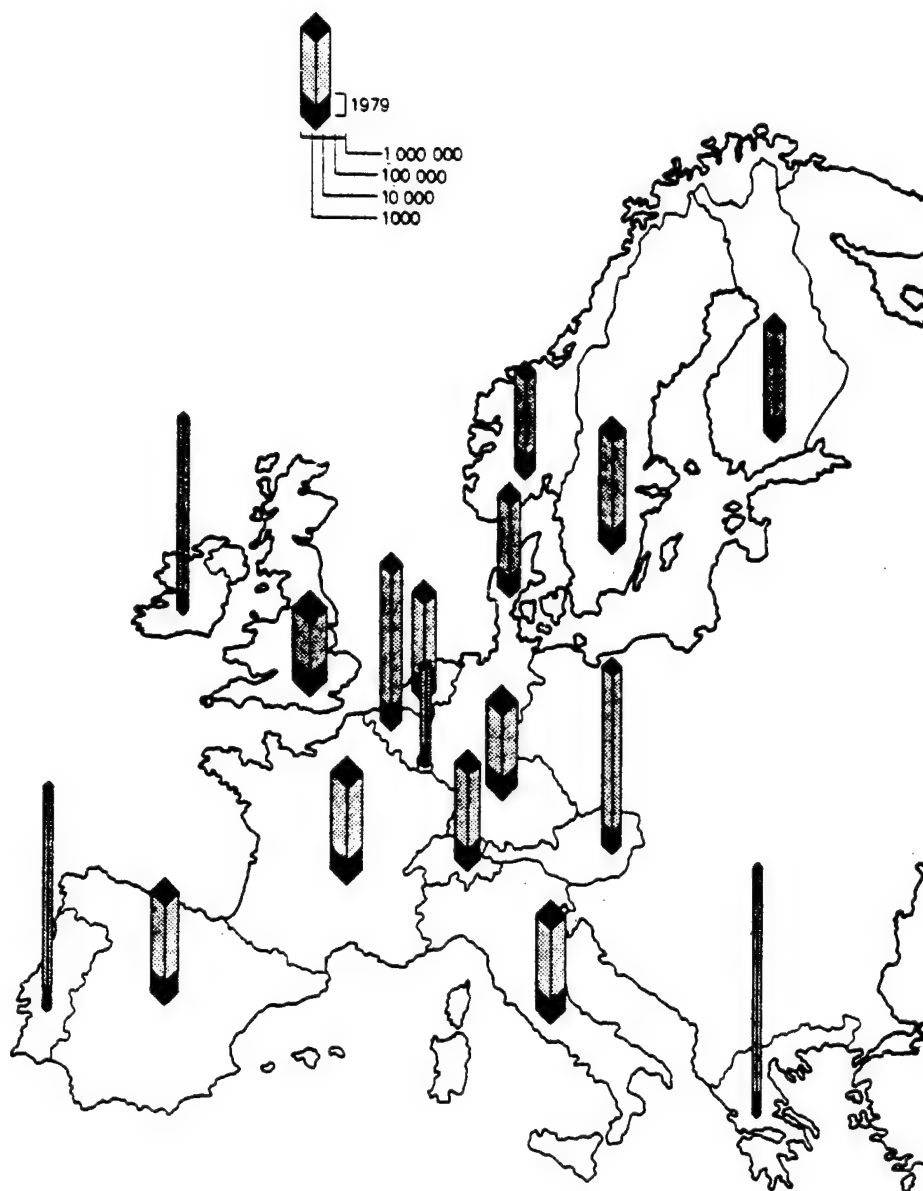


Fig. 1 - Growth of NTP's in Eurodata countries from 1979 to 1987. Tower heights represent 1987 values with respect to 1979.

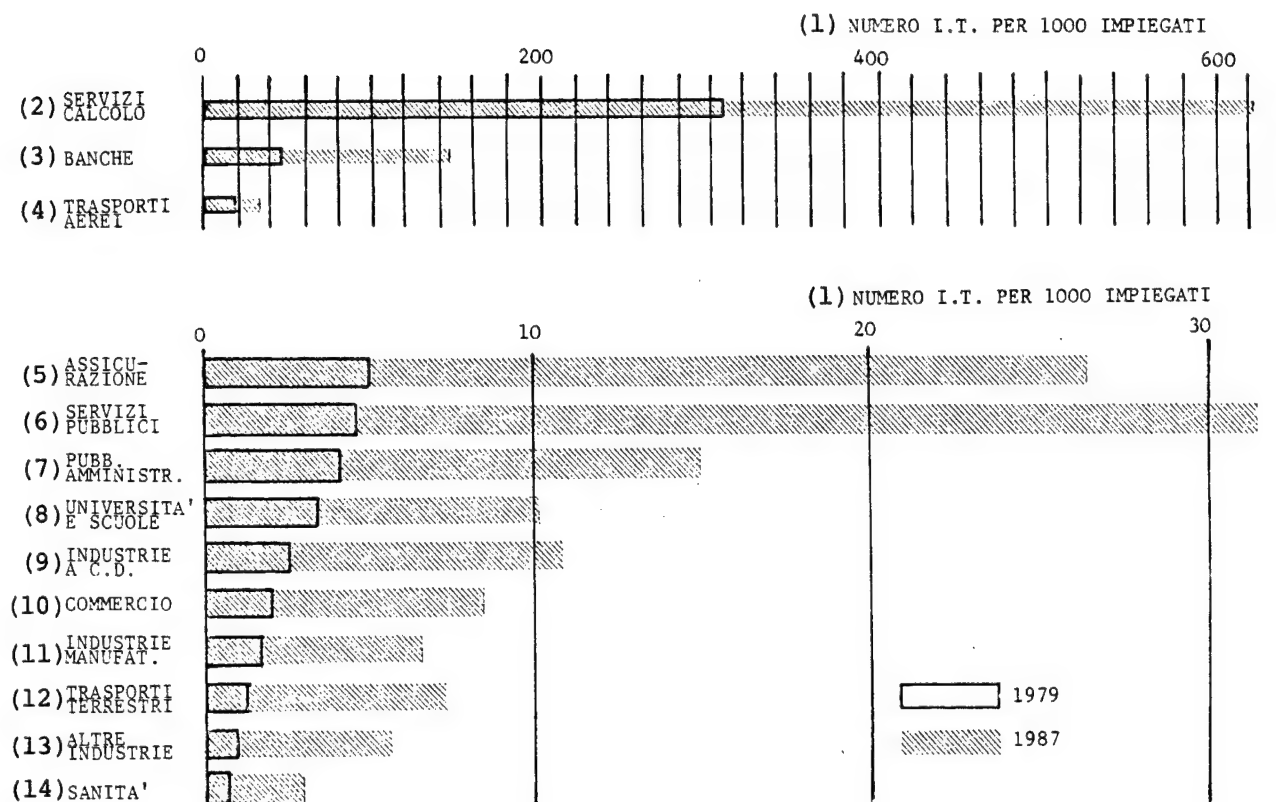
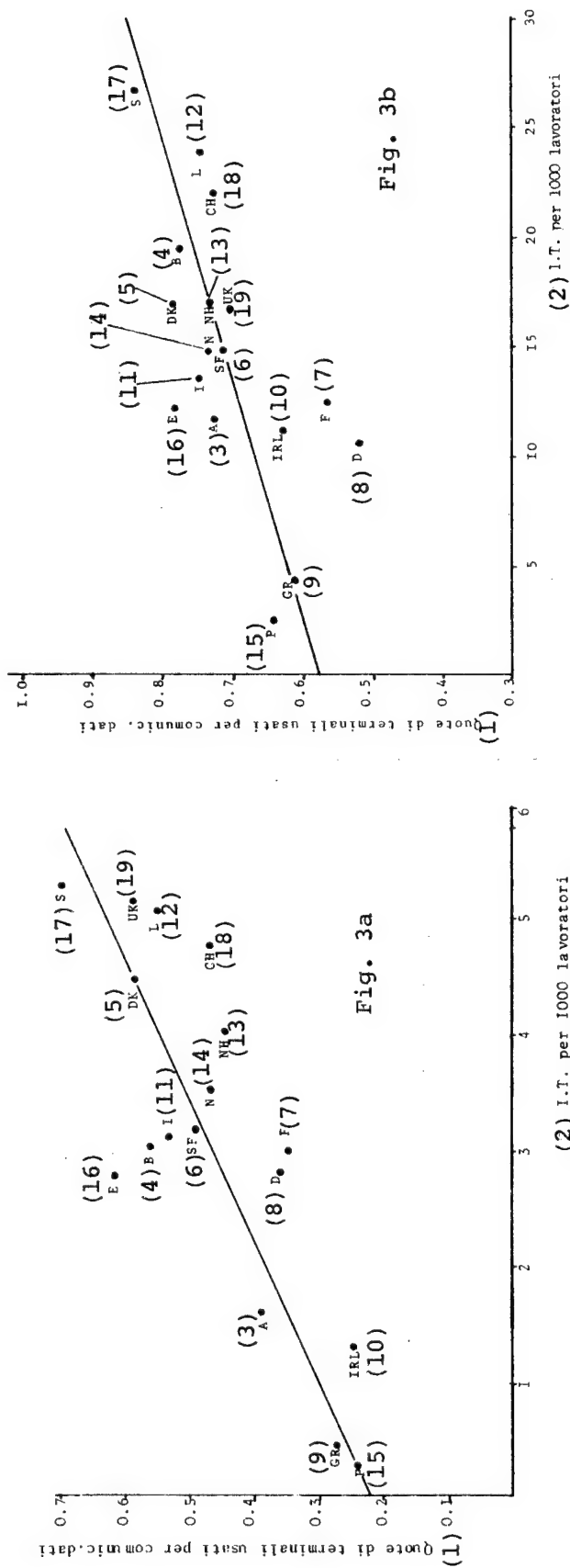


Fig. 2 - Average number of NTP's per 1,000 employees in various sectors.

Key:

- |   |                               |
|---|-------------------------------|
| 1. Number of NTP's per 1,000 employees. | 8. Universities and schools.  |
| 2. Computer services.                   | 9. Cyclical industries.       |
| 3. Banking.                             | 10. Commerce.                 |
| 4. Air transport.                       | 11. Manufacturing industries. |
| 5. Insurance.                           | 12. Surface transport.        |
| 6. Public services.                     | 13. Other industries.         |
| 7. Public administrations.              | 14. Public health.            |



Figs. 3 - Percentage of total terminals used for data communications as a function of the growth index (Fig 3a=1979; Fig 3b=1987).

Key:

- |  |                  |                     |
|--|------------------|---------------------|
| 1. Percentage of terminals used for data communications. | 8. Germany.      | 15. Portugal.       |
| 2. NTP's per 1,000 workers.                              | 9. Greece.       | 16. Spain.          |
| 3. Austria.  | 10. Ireland.     | 17. Sweden.         |
| 4. Belgium.  | 11. Italy.       | 18. Switzerland.    |
| 5. Denmark.  | 12. Luxembourg.  | 19. United Kingdom. |
| 6. Finland   | 13. Netherlands. |                     |
| 7. France.   | 14. Norway.      |                     |

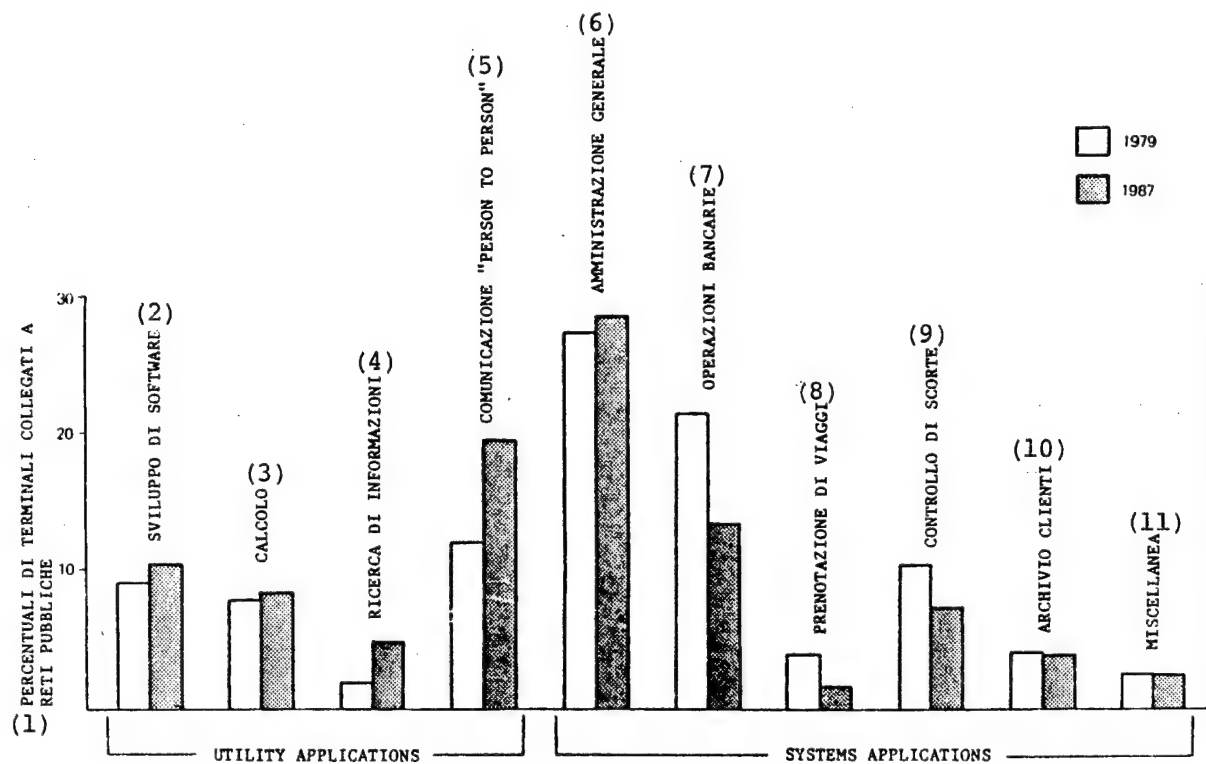


Fig. 4 - Percentage of total terminals for various applications (1979 and 1987).

Key:

1. Percentage of terminals connected to public networks.
2. Software development.
3. Calculations.
4. Information retrieval.
5. Person-to-person communications.
6. General administration.
7. Banking operations.
8. Travel reservations.
9. Inventory control.
10. Clients' archives.
11. Miscellaneous.

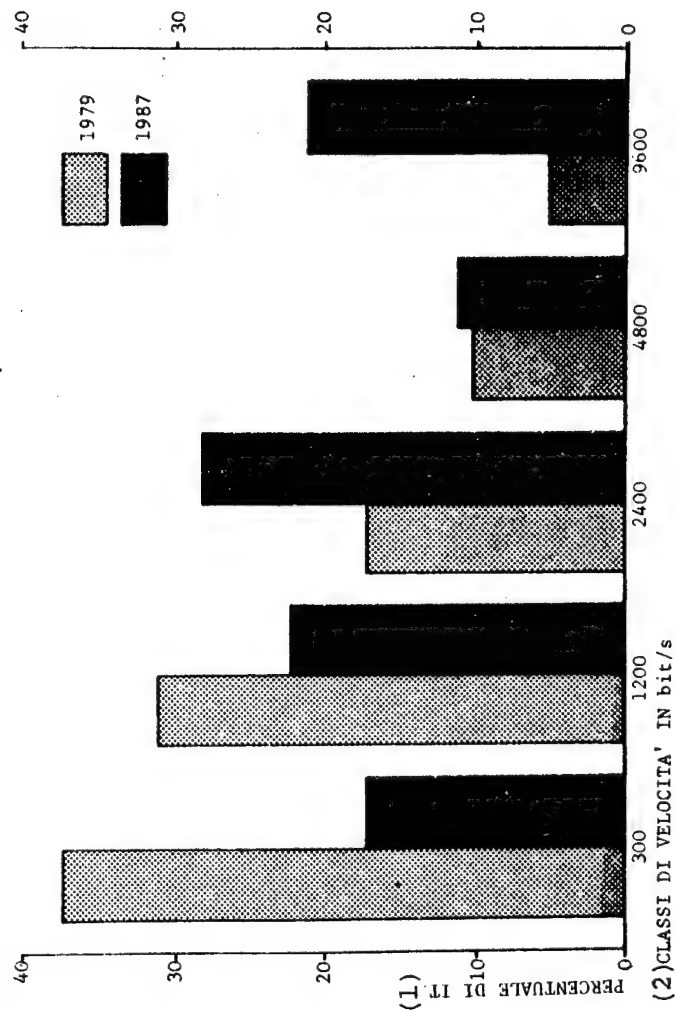


Fig. 5 - Percentage of NTP's in various speed categories (1979 and 1987).

Key:

1. Percentage of NTP's.
2. Speed categories in bits/sec.

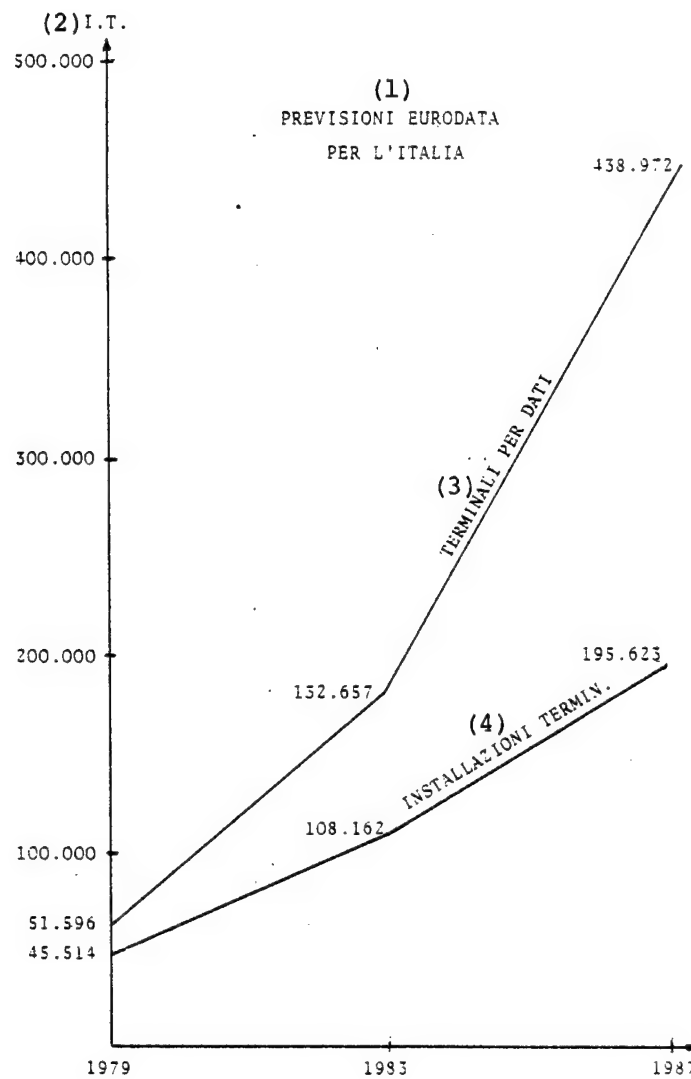


Fig. 6 - Terminals growth forecast for Italy.

Key:

1. Eurodata Forecast for Italy.
2. NTP's.
3. Data terminals.
4. NTP's.

Table 1 - Numbers of Data Terminals Connected to Telecommunications Networks in Eurodata Countries (1979-1987).

(1) Paesi	1979	1987
(2) Austria	6880	64800
(3) Belgio	22200	180000
(4) Danimarca	21100	133000
(5) Finlandia	9040	62600
(6) Francia	80700	570000
(7) Germania	96900	573000
(8) Grecia	790	15100
(9) Irlanda	1000	12500
(10) Italia	61600	439000
(11) Lussemburgo	1490	10600
(12) Olanda	25200	188000
(13) Norvegia	8770	59800
(14) Portogallo	750	12100
(15) Spagna	33900	244000
(16) Svezia	46600	319000
(17) Svizzera	22800	162000
(18) Inghilterra	185000	914000
Totale Paesi Eurodata	625000	3960000

Key (to Table 1):

1. Countries.
2. Belgium.
3. Denmark.
4. Finland.
5. France.
6. Germany.
7. Greece.
8. Ireland.
9. Italy.
10. Luxembourg.
11. Netherlands.
12. Norway.
13. Portugal.
14. Spain.
15. Sweden.
16. Switzerland.
17. United Kingdom.
18. Total - Eurodata countries.

Table 2 - Percentage Distribution of NTP's by Speed Categories in Italy.

(1) Anno	1979	1983	1987
(2) 300 bit/s	27,57 %	17,54 %	10,37 %
" 1200 bit/s	47,10 %	41,32 %	34,81 %
" 2400 bit/s	15,31 %	22,66 %	27,24 %
" 4800 bit/s	7,47 %	7,40 %	7,74 %
(3) > 4800 bit/s	2,55 %	11,08 %	19,84 %

Key (to Table 2):

1. Year.
2. Up to:
3. Over:

Table 3 - Ratio Between Numbers of Terminals in 1987 and 1979 by Types in Europe.

(1) Telescrivente	4,23
(2) Video Standard	7,20
(3) Batch remoto	4,57
(4) Video grafico	9,01
(5) Plotter	3,96
(6) Facsimile numerico	29,00
(7) Unità risposta audio	0,98
(8) Terminale bancario automatico	53,30
(9) Punto di vendita	2,31
(10) Controllo di processi	5,07
(11) Altri	18,30

Key (to Table 3):

1. Teleprinter.
2. Standard video.
3. Remote batch.
4. Graphics video.
5. Plotter.
6. Digital facsimile.
7. Audio response unit.
8. Automatic banking terminal.
9. Point of sale.
10. Processing control.
11. Other.



Table 4 - Distribution of Terminals in Italy by Applications.

Key:

(1) APPLICAZIONI	1979	%	1983	%	1987	%
(2) Sviluppo software	2351	3,8	8090	4,4	21544	4,9
(3) Calcolo	2797	4,5	9050	4,9	24122	5,5
(4) Gestione magazzini	3135	5,0	9116	5,0	20715	4,7
(5) Prenotazione viaggi	1589	2,6	2991	1,6	4940	1,1
(6) Amministrazione	20483	33,3	61645	33,7	145282	33,1
(7) Document. clienti	3456	5,6	8655	6,7	18748	4,3
(8) Transazioni bancarie	16479	26,9	43365	23,7	68137	15,5
(9) Punti di vendita	0	0	0	0	18	0
(10) Richiesta informaz.	657	1,0	4043	2,2	25960	5,9
(11) Controllo processi	84	0,1	189	0,1	389	0
(12) Comunicazione pers.	10020	16,3	33698	18,5	104303	23,9
(13) Altre	543	0,8	1813	1	4825	1,1
Totale	61696	100	182657	100	438972	100

1. Applications.  
 2. Software development.  
 3. Computations.  
 4. Warehouse management.  
 5. Travel reservations.  
 6. Administration.  
 7. Clients' documentation.  
 8. Banking transactions.  
 9. Point of sale.  
 10. Information retrieval.  
 11. Process control.  
 12. Person-to-person communications.  
 13. Other.

Table 5 - Number of Terminals in Italy by Industrial Sectors.

Key:

1. Sectors.  
 2. Banks and financial institutions.  
 3. Public administrations.  
 4. Manufacturing industries.  
 5. Cyclical industries.  
 6. Commerce.  
 7. Data processing centers.  
 8. Public services.  
 9. Universities and schools.  
 10. Hospitals and relief organizations.  
 11. Air transport.  
 12. Surface and maritime transport.  
 13. Insurance.  
 14. Other sectors.

(1) Settore	1979	%	1983	%	1987	%
(2) Banche e Istituti Finanziari	24.523	39,8	72.741	39,8	143.447	32,7
(3) Pubbliche Amministrazioni	9.213	14,9	20.279	11,1	40.983	9,3
(4) Industrie Manifatturiere	7.090	11,6	21.039	11,5	60.153	13,7
(5) Industrie a ciclo discontinuo	4.336	7,0	13.972	7,6	40.153	9,1
(6) Commercio	2.727	4,4	9.954	5,5	30.358	6,9
(7) Centri Elaborazione dati	1.337	2,2	3.570	2,4	9.040	2,1
(8) Servizi Pubblici	2.155	3,5	10.154	5,6	31.439	7,2
(9) Scuole e Università	1.949	3,2	5.315	2,9	12.680	2,9
(10) Ospedali e Enti assistenziali	1.313	2,1	3.682	2,0	9.142	2,1
(11) Trasporti Aerei	1.630	2,6	2.835	1,6	4.147	0,9
(12) Trasporti Terrestri e Navali	871	1,4	3.161	1,7	9.142	2,1
(13) Assicurazioni	606	1,1	2.211	1,2	6.125	1,4
(14) Altri settori	3.847	6,2	13.570	7,4	42.138	9,6

Table 6 - Data Traffic in Eurodata Countries (Millions of Information Transmissions/Day).

(1)	Anno	1979	1983	1987
(2)	Traffico nazionale	123	327	646
(3)	Traffico internazionale	26	75	212

Key:

1. Year.
2. Domestic traffic.
4. International traffic.

Table 7 - Distribution of NTP's by Regions in Italy.

(1)	Regione	1979 %	1983 %	1987 %
	Piemonte - Valle D'Aosta	10,45	11,57	12,72
	Lombardia	30,07	26,43	23,69
	Trentino Alto Adige - Veneto - Friuli V.G.	8,81	9,86	10,34
	Emilia Romagna	7,65	8,48	8,89
	Abruzzi - Molise - Marche - Umbria	2,96	3,20	3,32
(2)	Liguria	4,71	5,20	5,51
	Toscana	7,62	8,38	9,12
	Lazio	15,37	13,46	12,27
(3)	Sardegna	1,20	1,28	1,40
	Campania	4,45	4,81	4,95
	Puglia - Basilicata - Calabria	3,05	3,30	3,54
(4)	Sicilia	3,64	4,00	4,20
(5)	Totale I.T.	45.514	108.162	195.623

Key:

1. Region.
2. Tuscany.
3. Sardinia.
4. Sicily.
5. Total NTP's.

Table 8 - International Data Traffic for Italy (Thousands of Information Transmissions/Day).

		1979	%	1983	%	1987	%
(1)	Paesi Eurodata	1780	83,6	5682	82,7	16090	84,1
	USA	288	13,5	975	14,2	2498	13,1
(2)	Resto del Mondo	62	2,9	210	3,0	537	2,8
	Totale	2130		6867		19125	
(3)	Rapporto traffico internazionale 1987/79 = 9						
(4)	Rapporto traffico nazionale 1987/79 = 5,3						

Key:

1. Eurodata countries.
2. Rest of the world.
3. International traffic increase 1987/1979 = 9.
4. Domestic traffic increase 1987/1979 = 5.3.

Table 9 - Percentage Distribution of Traffic

(1)	Applicazioni	1979 %	1987 %
(2)	Amministrazione Generale	32,3	29,0
(3)	Calcolo e Software	24,8	31,5
(4)	Trans. bancarie	22,0	12,1
(5)	Controllo scorte	9,0	8,0
(6)	Comunicazioni testi	4,3	5,0
(7)	Archivio clienti	4,1	3,2
(8)	Ricerca informazioni	1,8	10,5
(9)	Prenotazione viaggi	1,7	0,7

Key:

1. Applications.
2. General administration.
3. Computations and software.
4. Banking transactions.
5. Inventory control.
6. Person-to-person communications.
7. Clients' archives.
8. Information retrieval.
9. Seating reservations.

9399

CSO: 5500/2266

## SWEDEN'S FIRST FACTORY FOR OPTICAL FIBERS OPENS

Stockholm NY TEKNIK in Swedish 20 May 82 p 14

[Article by Jan Segerfeldt]

[Text] Optical fiber production is beginning in Sweden. Sieverts Kabelverk in Sundbyberg is the manufacturer. Swedish success with fiber-optic telecommunications networks in Mexico and Saudi Arabia is responsible for this initiative.

So far, fiber optics is a complement to the traditional metal conductors, but the number of companies becoming involved in the optics industry is increasing. The hair-thin fibers are used in telecommunications networks and for signal transmission in industry, for process controls, etc.

Together with LM Ericsson, Sieverts installed the first fiber-optic facilities in the Middle East.

### Insensitive

Low weight, insensitivity to electromagnetic disturbances, and a high transmission capacity are responsible for the growth of fiber optics.

There are only about 30 companies in the world that manufacture both fibers and fiber cables. Most are in the United States, France, Japan, and England.

The first production in Sweden will begin in several days at Sieverts Kabelverk outside Stockholm. Final adjustments on the production process now are underway. Not unexpectedly, the first order is from the Swedish Telecommunications Service.

"By producing both fiber and cable under the same roof we have greater control over the quality than if we produced cable alone," Mats Granberg of Sieverts said.

"We also will not be dependent on any manufacturer of special fibers."

"While manufacturing our own cables, we may also sell fiber to other cable manufacturers."

### Various Fiber Types

Mats Granberg is head of the fiber production division and works at the new "optocenter." This is the company's name for the building in which fiber-optic equipment is developed and produced.

The final product at the optocenter is fiber cable. This includes industrial cable for process controls and cable for telecommunications. The different cable types require different types of fiber. The fibers are manufactured in two different processes.

One common requirement for the two processes is purity.

"As little as 10 parts per billion iron or copper can destroy the optical properties of the finished fiber," Mats Granberg continued.

A high overpressure inside the plant where the fiber is produced helps keep dust and dirt away.

#### Less Sensitive

The finished fiber is coated immediately with a protective layer of silicon rubber. The fiber then is less susceptible to damage in the subsequent cable production--the cabling.

The first step in converting the fiber to cable is coating it with additional protective plastic layers.

An ordinary injection molding machine is used to produce a plastic tube in which the fiber lies loose.

"The tube protects the fiber from water, jolts, and pressure," said Bjorn Kjellman who is responsible for the cable production.

The protected fiber then is placed in a traditional stranding machine. The cable then is twisted using a number of fibers, each in its own tube.

In addition to fibers, the cable also contains a tensile-stress reducer. The fibers alone cannot withstand all the mechanical stresses to which the cable is subjected. The tensile-stress reducer may be of steel or of polyester for totally metal-free cables. A plastic sheath is injection molded on the outside.

Telecommunications is not the only growing market for optical cable, according to Sieverts.

#### Unaffected

Process control is one example of industrial use. There the risk of electrical disturbances is great. An optical cable is totally unaffected by electrical disturbances. An optical cable can be used in conjunction with a power cable without interfering with the transmission of information.

If and when the great fiber boom will come is an open question, but Sieverts seems to be preparing itself. Its plants are built for expansion--from 3,000 km fiber this year to 10,000 km by 1985.

9336

CSO: 5500/2279

END